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June 24, 2011

U.S. Army Engineer District, Kansas City
Attn: Mr. Ken Maas
601 East 12th Street
Kansas City, MO 64106-2896

Re: Draft Baseline Human Health Risk Assessment – Operable Unit 03 (OU-3): Groundwater
Cornell-Dubilier Electronics Superfund Site, South Plainfield, NJ
U.S. Army Corps of Engineers Contract Number W912DQ-08-D-0017, TO 0008

Dear Mr. Maas:

On the heels of last week's Draft Remedial Investigation (RI) Report, Louis Berger and Malcolm Pirnie are very pleased to submit this Draft version of the Baseline Human Health Risk Assessment (BHHRA) Report for Operable Unit 03 (Groundwater) at the Cornell-Dubilier Electronics Superfund Site. This document supports the Draft RI, and the findings presented are consistent with those discussed in recent meetings and conference calls between USACE, USEPA, and Louis Berger / Malcolm Pirnie. This is the second of three scheduled Draft submissions: the Draft Feasibility Study is now scheduled to be submitted on July 8th.

The electronic file for the text, figures, and tables has been posted to:

<https://sp.louisberger.com/usace/CDEOU3/Shared%20Documents/Forms/AllItems.aspx>

The appendices will be posted Monday once they are all fully assembled. Hard copies of the Draft document will be sent out Monday.

Based on the June 6th version of the schedule, the Government has a 40 calendar day review period; comments are due to Louis Berger / Malcolm Pirnie by August 3rd. We understand that the comments will be delivered via Dr. Checks.

We look forward to your review of this critical document and discussing it with you. Please call me at 914-798-3711 or Rich Califano at 201-398-4307 if you have any questions.

Very truly yours,

THE LOUIS BERGER GROUP, INC.

Edward A. Dudek Jr., PE
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Attachments (electronic files)

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ADAF	Age-dependent adjustment factor
ALM	Adult Lead Model
AT	Averaging time
ARAR/TBC	Applicable or Relevant and Appropriate Requirements/To Be Considered
ATSDR	Agency for Toxic Substances and Disease Registry
Bgs	below ground surface
BHHRA	Baseline Human Health Risk Assessment
BW	Body weight
CalEPA	California Environmental Protection Agency
CDE	Cornell-Dubilier Electronics
CLP	Contract Laboratory Program
COPC	Chemical of potential concern
CTE	Central tendency exposure
DA _{event}	Absorbed dose per event
DAD	Dermally absorbed dose
EC	Exposure concentration
ED	Exposure duration
EF	Exposure frequency
EPC	Exposure point concentration
EPM	Equivalent porous medium
ET	Exposure time
EV	Event frequency
FA	Fraction absorbed
FPW	Former production well
FS	Feasibility study
HEAST	Health Effects Assessment Summary Tables
HI	Hazard index
HQ	Hazard quotient
HxCDD	Hexachlorodibenzo-p-dioxin
IEUBK	Integrated Exposure Uptake Biokinetic (Model for Lead in Children)
IR-W	Ingestion rate, groundwater
IRIS	Integrated Risk Information System
Kp	Permeability coefficient

msl	mean sea level
NAPL	Non-aqueous phase liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
OU	Operable unit
PAH	Polycyclic aromatic hydrocarbon
PbB	Blood lead level
PCB	Polychlorinated biphenyl
PPRTV	Provisional peer-reviewed toxicity value
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RfC	Reference concentration
RfD	Reference dose
RI	Remedial investigation
RME	Reasonable maximum exposure
ROD	Record of decision
RSL	Regional screening level
SA	Surface area
SVOC	Semi-volatile organic compound
t-event	Event duration
T-event	Lag time per event
TCDD	Tetrachlorodibenzo-p-dioxin
TCE	Trichloroethylene; trichloroethene
TCL	Target compound list
TEF	Toxic equivalence factor
TEQ	Toxic equivalence
UCL	Upper confidence level
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound
WHO	World Health Organization

Executive Summary

This baseline human health risk assessment (BHHRA) was conducted to support the Remedial Investigation/Feasibility Study (RI/FS) for Operable Unit 3 (OU3) at the Cornell-Dubilier Electronics (CDE) Superfund Site (Site). The former CDE facility is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey and covers approximately 26 acres. Between 1936 and 1962, CDE manufactured electronic components, including capacitors. It has been reported that the company also tested transformer oils for an unknown period of time. Polychlorinated biphenyls (PCB) and chlorinated organic degreasing solvents were used in the manufacturing process, and it has been alleged that during CDE's period of operation, the company disposed of PCB-containing materials and other hazardous substances at the facility. The primary Site-related contaminants are volatile organic compounds (VOC) and PCBs.

OU3 addresses groundwater. Consistent with the RI Report, the following terminology is used throughout this BHHRA:

- The "Site" refers to all four OUs which comprise the CDE Superfund Site, and the extent of each OU investigation;
- The "former CDE facility" refers to the physical extent of the industrial park operated at 333 Hamilton Boulevard; and
- "OU3" refers to the geographic extent of the groundwater contamination and associated investigation.

The purpose of this BHHRA is to provide an evaluation of potential human health risks, currently and in the future, in the absence of any major action to control or mitigate groundwater contamination (i.e., baseline risks). The potential for adverse health effects was expressed as incremental lifetime cancer risks and non-cancer hazards that were based on assumptions regarding the potential for human exposure to chemicals in groundwater, the estimated concentration of each chemical of potential concern (COPC) at the point of human contact, and the toxicity of each COPC.

The BHHRA followed guidance outlined in the United States Environmental Protection Agency's (USEPA) *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part A)* (RAGS) (USEPA, 1989) and other relevant USEPA

guidance. As such, the BHHRA is composed of the following four parts: data evaluation, exposure assessment, toxicity assessment, and risk characterization (USEPA, 1989; NRC, 1983).

Data Evaluation

The BHHRA is based on the results of groundwater samples collected by Malcolm Pirnie, Inc. in October 2009, March-April 2010, July 2010, December 2010, and March 2011. Groundwater samples were collected from twelve (12) shallow bedrock wells located within the former CDE facility property boundary and twenty (20) deep bedrock wells located throughout the Site. The deep bedrock wells are referred to as FLUTE™ or multi-port wells and were installed with multiple ports to sample, generally, between two and nine discrete depth intervals per well.

Groundwater samples were collected from all wells in October 2009 and March-April 2010 and were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals (including mercury), and cyanide. Groundwater samples were collected from a subset of 24 wells in March-April 2010 and July 2010 for PCB congener and dioxin/furan analyses. In December 2010 and March 2011, groundwater samples were collected from only the newly-installed MW-23 and were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals (including mercury), and cyanide. Based on review of the laboratory data and USEPA Region 2 data validation reports, the majority of the groundwater data was of acceptable quality overall but subject to the data validator's qualifying remarks. However, following review of the validated PCB congener data from March-April 2010, it was decided not to use the PCB congener and dioxin/furan data from MW-11.¹

Based on the conceptual understanding of Site-specific hydrogeology and to facilitate evaluation of the potential for human exposure to groundwater through the various pathways outlined in the Site Conceptual Exposure Model, the following groundwater exposure units were established for this BHHRA:

- Entire aquifer – includes groundwater data from all wells and across all sample depths. However, groundwater data from ERT-8 was not included, because it is an upgradient well considered representative of background conditions.

¹ The March-April 2011 PCB congener data from MW-11 were qualified by the USEPA data validator as non-detect at elevated reporting limits due to method blank and equipment rinseate blank contamination.

- Shallow onsite groundwater – includes groundwater data from the shallow bedrock monitoring wells and the most shallow sampler port in each multi-port well located within the former CDE facility property boundary.
- Shallow offsite groundwater, south of Bound Brook – includes groundwater data from the most shallow sampler port in each of the multi-port wells located outside the former CDE facility property boundary and south of Bound Brook. Groundwater data from ERT-8 were not included, because it is an upgradient well considered representative of background conditions.
- Shallow offsite groundwater, north of Bound Brook – includes groundwater data from the most shallow sampler port in each of the multi-port wells located outside the former CDE facility property boundary and north of Bound Brook.

COPCs were identified in each groundwater exposure unit, based primarily on comparison of the maximum concentration of each detected chemical to the USEPA Regional Screening Levels for tap water but including other selection criteria as well.

Exposure Assessment

Representative exposure point concentrations (EPC) to be used in the calculation of lifetime incremental cancer risks and non-cancer hazards were estimated for each COPC. Concentrations in groundwater and indoor air were calculated to evaluate human exposure through the potential pathways and exposure routes outlined in the Site Conceptual Exposure Model. This model describes the scenario timeframe, exposure medium, exposure point, and the exposure pathways and routes by which human receptors may be exposed to COPCs originating in groundwater.

Based on the current and most likely future land uses of the Site, the following human receptor populations were identified: commercial/industrial workers, resident adults, resident children, and construction/utility workers. The potential for dermal contact and inhalation exposure to chemicals in groundwater used for process or industrial uses was evaluated for commercial/industrial workers. The potential for ingestion, dermal contact, and inhalation exposure to chemicals in groundwater used as a source of potable water was evaluated for resident adults and children. The potential for dermal contact and inhalation exposure to chemicals in groundwater that pools at the bottom of a trench excavated for utility work was evaluated for construction/utility workers. The applicable exposure unit for the commercial/industrial worker, resident adult and resident child exposure scenarios was the entire aquifer. Each of the three shallow groundwater

exposure units was used in a separate evaluation of potential construction/utility worker exposure.

To evaluate ingestion and dermal contact exposures, representative EPCs for COPCs in groundwater were calculated as the 95% upper confidence limit (UCL) on the arithmetic average concentration using the USEPA's ProUCL version 4.1.00 software. To evaluate inhalation exposures for resident adults and children, concentrations of the volatile COPCs in indoor air were estimated using the "Schaum Model." A modified version of the Schaum Model was used to estimate concentrations of volatile COPCs in indoor air to evaluate commercial/industrial worker exposure. To evaluate inhalation exposures for construction/utility workers, concentrations of volatile COPCs in outdoor air around an excavation were estimated by calculating COPC-specific emission fluxes and predicting COPC concentrations using a screening-level atmospheric dispersion model.

USEPA-recommended equations and exposure parameter values were used to estimate human exposure in the form of daily chemical intakes, dermally absorbed doses, or exposure concentrations. These exposure estimates were then combined with chemical-specific toxicity information to estimate incremental lifetime cancer risks and non-cancer hazards in the Risk Characterization. In accordance with USEPA guidance, estimates of reasonable maximum exposures (RME) and, where applicable, central tendency exposures (CTE) were generated. Use of RME parameter values simulates the highest exposure that might reasonably be expected to occur, one that is well above the average case but within the range of possibility, and results in upper-bound incremental lifetime cancer risks and non-cancer hazards. Evaluation of the RME scenario serves as the determination regarding remedial action.

Toxicity Assessment

Chemical-specific toxicity information is in the form of cancer potency slope factors or unit risk factors and non-cancer reference doses or reference concentrations. Toxicity values were obtained from the following hierarchy of sources: USEPA's Integrated Risk Information System, USEPA's Provisional Peer-Reviewed Toxicity Values, and additional sources, including but not limited to the California Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry.

The USEPA has not derived toxicity values for lead. Rather, the potential for adverse health effects from exposure to lead is evaluated through comparison of predicted blood lead levels to a health-protective goal. The USEPA's stated goal for lead is that children

have no more than a 5% probability of exceeding a PbB (blood lead) level of 10 µg/dL. As such, this level is assumed to also provide protection for adults. The USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children was used to evaluate resident child exposure to lead in groundwater used for drinking water.

Risk Characterization

Individual (i.e., COPC-specific) incremental lifetime cancer risks and non-cancer hazard quotients were calculated for each potential human receptor population. For the construction/utility worker, separate risk estimates were generated for each of the three shallow groundwater data sets.

Individual incremental lifetime cancer risks are expressed as unitless probabilities (e.g., 2E-06 or 2 in 1,000,000) of a person developing cancer. The individual cancer risks for each exposure scenario were summed to arrive at an estimate of the total cancer risk from exposure to multiple chemicals. For known or suspected carcinogens, the National Oil and Hazardous Substances Contingency Plan (NCP) established that acceptable exposure levels are generally concentration levels that represent an incremental upper-bound lifetime cancer risk in the range from 10^{-4} (i.e., 1E-04 or 1 in 10,000) to 10^{-6} (i.e., 1E-06 or 1 in 1,000,000) or less. The cancer risks estimated for each exposure scenario were compared to this risk range established by the NCP.

Non-cancer hazard is expressed as the unitless ratio, termed the hazard quotient (HQ), of the daily chemical intake or exposure concentration to the non-cancer reference dose or reference concentration. For systemic toxicants, the NCP established that "acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety" (USEPA, 1990). As the non-cancer reference dose is protective of the potential for adverse, non-cancer health effects, HQs greater than 1E+00 indicate the potential for non-cancer hazard. The total individual non-cancer HQs were summed for each exposure scenario to yield hazard indices (HI) that reflect the potential for adverse, non-cancer health effects from exposure to multiple chemicals.

Table ES-1 presents the incremental lifetime cancer risks and non-cancer hazards for each RME scenario evaluated in the BHHRA for OU3. As shown, the incremental lifetime cancer risks range from 8E-07 for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to 2E-02 for the resident adult.

Incremental lifetime cancer risks for the commercial/industrial worker, resident adult and resident child are greater than the cancer risk range established by the NCP. The predominant contributors to the cancer risk estimated for the resident adult are 4,4'-DDT, 4,4'-DDD, trichloroethylene, and arsenic.

Non-cancer HIs range from 3E+00 for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to 8E+02 for the resident child. The non-cancer HIs are greater than 1E+00 for all potential human receptors, indicating there is the potential for adverse, non-cancer health effects from exposure to groundwater. The predominant contributors to the non-cancer hazard estimated for the resident child are cis-1,2-dichloroethene, total PCB Aroclors, and 4,4'-DDT.

Table ES-1 Summary Table: Human Health Cancer Risks and Noncancer Hazards for RME Scenario Baseline Human Health Risk Assessment Cornell Dubilier Electronics Inc. Superfund Site OUS									
Exposure Medium	Human Receptor Population	Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices			
		Exposure Routes			Receptor Total	Exposure Routes			Receptor Total
		Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation	
Entire Aquifer	Commercial/Industrial Worker	N/A	5E-03	3E-03	8E-03	N/A	1E+02	2E+01	1E+02
Shallow Onsite Groundwater	Construction/Utility Worker	N/A	5E-05	5E-08	5E-05	N/A	7E+01	4E-03	7E+01
Shallow Offsite Groundwater, South Bound Brook	Construction/Utility Worker	N/A	3E-05	2E-09	3E-05	N/A	2E+01	4E-05	2E+01
Shallow Offsite Groundwater, North Bound Brook	Construction/Utility Worker	N/A	8E-07	5E-10	8E-07	N/A	3E+00	2E-05	3E+00
Entire Aquifer	Resident Adult	6E-03	1E-02	1E-03	2E-02	2E+02	1E+02	4E+00	4E+02
Entire Aquifer	Resident Child	2E-03	4E-03	5E-04	7E-03	5E+02	3E+02	1E+01	8E+02
Notes N/A - Not applicable									

Table ES-2 presents the incremental lifetime cancer risks and non-cancer hazards for the CTE scenario. The incremental lifetime cancer risks range from 2E-07 for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to 3E-03 for the resident child. Incremental lifetime cancer risks for the commercial/industrial worker, resident adult and resident child are greater than the cancer risk range established by the NCP.

Non-cancer HIs range from 3E+00 for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to 4E+02 for the resident child. Again, the non-cancer HIs are greater than 1E+00 for all potential human receptors, indicating there is the potential for adverse, non-cancer health effects from exposure to groundwater.

Table ES-2 Summary Table: Human Health Cancer Risks and Noncancer Hazards for CTE Scenario Baseline Human Health Risk Assessment Cornell Dubilier Electronics Inc. Superfund Site OUS									
Exposure Medium	Human Receptor Population	Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices			
		Exposure Routes			Receptor Total	Exposure Routes			Receptor Total
		Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation	
Entire Aquifer	Commercial/Industrial Worker	N/A	1E-03	4E-04	2E-03	N/A	9E+01	9E+00	1E+02
Shallow Onsite Groundwater	Construction/Utility Worker	N/A	1E-05	1E-08	1E-05	N/A	6E+01	3E-03	6E+01
Shallow Offsite Groundwater, South Bound Brook	Construction/Utility Worker	N/A	8E-06	6E-10	8E-06	N/A	2E+01	3E-05	2E+01
Shallow Offsite Groundwater, North Bound Brook	Construction/Utility Worker	N/A	2E-07	1E-10	2E-07	N/A	3E+00	2E-05	3E+00
Entire Aquifer	Resident Adult	7E-04	2E-03	5E-05	2E-03	1E+02	9E+01	8E-01	2E+02
Entire Aquifer	Resident Child	1E-03	2E-03	6E-05	3E-03	3E+02	2E+02	1E+00	4E+02
Notes N/A - Not applicable									

Further evaluation of the entire aquifer data set revealed relatively elevated COPC concentrations in a few wells located within the former CDE facility boundary. The presence of these concentrations may bias the calculated EPCs high, such that the cancer risks and non-cancer hazards estimated using the entire aquifer data set may not reflect the potential for adverse health effects from exposure to groundwater across the entire Site. An alternate evaluation was therefore presented in the Risk Characterization, in which the EPCs used to estimate the baseline cancer risks and non-cancer hazards were replaced with alternate EPCs calculated using data sets excluding MW-06, MW-11, MW-12, and MW-14S. The cancer risks and non-cancer hazards estimated using the revised EPCs were still greater than the risk range established by the NCP and the target non-cancer HI of 1E+00. Based on this evaluation, the potential for adverse health effects indicated in this BHHRA cannot be explained by groundwater concentrations detected in the onsite monitoring wells alone.

In addition, the RI Report established that aqueous mass from the former CDE facility has been interpreted to not extend to ERT-5 and ERT-6 in the intermediate zone, and MW-18 in the deep zone. Because of the uncertainty associated with modeling groundwater flow through fractured bedrock, groundwater data from ERT-5, ERT-6, and MW-18 were included in the entire aquifer and shallow offsite, south of Bound Brook data sets used to estimate baseline cancer risks and non-cancer hazards. However, to determine the relative contribution that groundwater data from these offsite wells make to

the baseline cancer risks and non-cancer hazards estimated in this BHHRA, an uncertainty evaluation was conducted using only groundwater data from ERT-5, ERT-6, and MW-18. Based on this evaluation, it was concluded that a portion of the potential for cancer risk and non-cancer hazard indicated in the baseline evaluation may be attributed to concentrations of dibenzo(a,h)anthracene, total PCB Aroclors, and arsenic detected in ERT-5, ERT-6, and MW-18.

For the evaluation of the potential for adverse health effects from resident child exposure to lead in drinking water, the geometric mean PbB concentration estimated using the IEUBK model is 2.6 µg/dL. The probability that the PbB concentration is greater than 10 µg/dL is 0.22 percent. Therefore, lead concentrations in groundwater should not pose a risk to resident children or, by extension, to resident adults.

1. Introduction

This risk assessment presents an evaluation of potential human health risks associated with exposure to chemicals detected in groundwater at the Cornell-Dubilier Electronics (CDE) Superfund Site (Site) [EPA ID: NJD981557879].

The objectives of the risk assessment are to:

- Evaluate potential human health risks, currently and in the future, in the absence of any major action to control or mitigate groundwater contamination (i.e., baseline risks).
- Assist in determining the need for and extent of groundwater remediation.
- Provide a basis for comparing remedial alternatives and determining which will meet the goals of protection of human health and the environment and Applicable or Relevant and Appropriate Requirements (ARAR), as defined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR Part 300.5).

The baseline human health risk assessment (BHHRA) follows guidance outlined in the United States Environmental Protection Agency's (USEPA) *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual Part A* (RAGS) (USEPA, 1989) and other USEPA guidance cited throughout this document. The BHHRA is presented in a series of tables that follow the USEPA's RAGS Part D (USEPA, 2001) format. These tables are provided in Appendix A.

The BHHRA is based on the results of groundwater samples collected in October 2009, March-April 2010, July 2010, December 2010, and March 2011. The groundwater sampling methodology and nature and extent of groundwater contamination are discussed in the Remedial Investigation (RI) Report for Operable Unit 3 (OU3), of which this BHHRA is a part. Historical data from previous Site investigations are summarized herein but were not included in the quantitative assessment of human health risks.

Consistent with the RI Report, the following terminology is used throughout this BHHRA:

- The "Site" refers to all four OUs which comprise the CDE Superfund Site, and the extent of each OU investigation;

- The “former CDE facility” refers to the physical extent of the industrial park operated at 333 Hamilton Boulevard; and
- “OU3” refers to the geographic extent of the groundwater contamination and associated investigation.

The following provides an overview of the Site location and background, a summary of previous Site investigations, and descriptions of the key physical attributes, surrounding land uses, and demographics.

1.1. Site Location and Background

The former CDE facility is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey and covers approximately 26 acres. Most recently, the property was known as the Hamilton Industrial Park. It contained numerous buildings that were demolished by the USEPA in 2008 following relocation of the industrial park tenants.

As shown on Figure 1-1, the former CDE facility is bounded on the northeast by Bound Brook and the former Lehigh Valley Railroad, Perth Amboy Branch (presently Conrail); on the southeast by Bound Brook and a property used by the South Plainfield Department of Public Works; on the southwest, across Spicer Avenue, by single family residential properties; and to the northwest, across Hamilton Boulevard, by mixed residential and commercial properties.

The Spicer Manufacturing Company operated a manufacturing plant on the property from 1912 to 1929. They manufactured universal joints and drive shafts, clutches, drop forgings, sheet metal stampings, screw products, and coil springs for the automobile industry. The plant included a machine shop, box shop, lumber shop, scrap shop, heat treating building, transformer platform, forge shop, shear shed, boiler room, acid pickle building, and die sinking shop. A chemical laboratory for the analysis of steel was added in 1917. Most of the major structures were erected by 1918. When the Spicer Manufacturing Company ceased operations at the facility, the property consisted of approximately 210,000 square feet of buildings (FWENC, 2002).

After the departure of the Spicer Manufacturing Company, CDE manufactured electronic components, including capacitors, from 1936 to 1962. It has been reported that the company also tested transformer oils for an unknown period of time. Polychlorinated biphenyls (PCB) and chlorinated organic degreasing solvents were used in the

manufacturing process, and it has been alleged that during CDE's period of operation, the company disposed of PCB-containing materials and other hazardous substances at the facility. It has been reported that the rear of the property was saturated with transformer oils and capacitors were also buried behind the facility during the same period (FWENC, 2002).

Since CDE's departure from the facility in 1962, it has been operated as a rental property consisting of commercial and light industrial tenants. Numerous tenants have occupied the complex. In 2007, the USEPA began implementing the OU2 ROD with the relocation of the tenants at the industrial park and demolition of the 18 buildings. Relocation of the tenants was completed in mid-2007; demolition of the buildings was completed in May 2008; and OU2 soil remedial activities are ongoing. A Plan View of the former CDE facility, showing the location of former buildings, is shown on Figure 1-2 in the RI Report.

The developed portion of the facility (the northwestern portion) comprised approximately 45 percent of the total land area and contained temporary asphalt capping following building demolition, a system of catch basins to channel stormwater flow, and paved roadways. Several of the catch basins drained into a stormwater collection system with outfalls that discharge at various locations along Bound Brook. The other 55 percent of the property was predominantly vegetated before OU2 remedial activities began. The central part of the undeveloped portion was primarily an open field, with some wooded areas to the northeast and south, and a deteriorated, partially paved area in the middle of the undeveloped portion of the facility. The northeast and southeast boundaries consist primarily of wetland areas adjacent to Bound Brook, which flows from the eastern corner across the northeastern border of the undeveloped portion of the facility (FWENC, 2002). Once OU2 remedial activities are completed (anticipated to be late 2011) the entire former CDE facility will be covered by an asphalt cap with a storm water collection system.

1.2. Previous OU3 Investigations

Environmental conditions at the former CDE facility were first investigated by the New Jersey Department of Environmental Protection (NJDEP) in 1986. Subsequent sampling by the NJDEP and USEPA revealed elevated concentrations of PCBs, VOCs, and inorganic chemicals in soil, surface water, and sediment. In 1997, the USEPA conducted a preliminary investigation of Bound Brook and also collected surface soil and interior dust samples from nearby residential and commercial properties. These investigations led

to fish consumption advisories for Bound Brook and its tributaries. As a result of these sampling activities, the Site was added to the National Priorities List (NPL) in July 1998. Between 1997 and 2000, the USEPA ordered several removal actions to be performed, including:

- Removing PCBs in interior dust and soils at residential properties located west and southwest of the former CDE facility.
- Paving driveways and parking areas, installing a security fence, and implementing drainage controls at the property.

In 2000, an RI was conducted by Foster Wheeler, Inc. that included the collection of soil, sediment, and building surface samples, as well as the installation and sampling of twelve shallow bedrock monitoring wells (MW-01A, MW-02A, and MW-03 through MW-12). Groundwater samples were also collected from a former production well ("Former Production Well Number 3") at the former CDE facility (FWENC, 2001b). Shortly thereafter, the USEPA divided the Site into four OUs, as follows, to facilitate investigation and remediation:

- OU1 addresses residential, commercial, and municipal properties in the vicinity of the former CDE facility.
- OU2 consists of former CDE facility soils and buildings.
- OU3 consists of groundwater.
- OU4 addresses Bound Brook.

RODs were issued for OU1 and OU2, respectively, in September 2003 and September 2004. This BHHRA was conducted as part of the RI/Feasibility Study (FS) for OU3.

In January 2008, seven deep bedrock wells (ERT-1 through ERT-7) were drilled by the USEPA to assess the hydraulic properties of the fractured bedrock and water quality of the bedrock groundwater up- and down-gradient of the former CDE facility. The wells were drilled to an average depth of 150 feet below ground surface (bgs). In February 2008, one additional deep bedrock well (ERT-8) upgradient of the former CDE facility was also drilled. Prior to installation of these wells, groundwater samples for VOC analysis were collected from multiple depths using packer sampling techniques, targeting discrete water bearing zones within each well. ERT-1 through ERT-6 and ERT-8 were

completed by the USEPA in June 2008 with FLUTETM multi-port sampling devices. In August 2008, groundwater samples were collected by the USEPA from these seven FLUTETM wells² and the twelve shallow bedrock monitoring wells and were analyzed for VOCs, semi-volatile organic compounds (SVOC), pesticides, PCB Aroclors, and metals. Figure 1-2 depicts the locations of the twelve shallow bedrock wells and eight deep bedrock wells drilled prior to 2009. The historical groundwater data are presented and summarized in Appendix B.

1.3. Physical Characteristics of the Site

The following is a general description of the physical characteristics of the Site.

1.3.1. Surface Features

Figure 1-3 contains a topographic map of the former CDE facility and surrounding areas. As described above, the northwestern portion of the former CDE facility (comprising approximately 45 percent of the total facility acreage) was developed and contained the buildings that have since been demolished. The land in this northwestern portion was gently sloping, with pre-building demolition elevations ranging from 70 to 82 feet above mean sea level (msl).

The remaining 55 percent of the land area was undeveloped and predominantly vegetated. The central part of the undeveloped portion was primarily an open field, with some wooded areas to the south and a paved area in the middle. Topography dropped steeply to the northeast and southeast, and the eastern portion of the property consists primarily of wetlands bordering Bound Brook. Elevations range from approximately 71 feet above msl at the top of the bank to approximately 60 feet above msl along the Bound Brook (FWENC, 2001b).

1.3.2. Climate

The climate for Middlesex County is classified as temperate. Polar continental air masses control the region's winter weather and tropical air masses control summer weather. Although the heaviest rains are produced by coastal storms of tropical origin, a portion of the air masses originate from the Great Lakes. Prevailing winds are from the northwest from October through April, and from the southwest the remainder of the year.

² ERT-7 was not constructed as a FLUTETM well until September 2009; therefore, groundwater samples were not collected from ERT-7 in August 2008.

In South Plainfield, the temperature ranges from an average of 29°F in January to 75°F in July, with an average annual temperature of about 53°F (FWENC, 2002). Summer temperatures occasionally exceed 100°F and temperatures in the middle to upper 80's (°F) occur frequently. Winter temperatures generally are not below 20°F for long time periods (FWENC, 2002). The average annual precipitation is approximately 49 inches. Precipitation occurs fairly evenly throughout the year.

1.3.3. Geology

The Site lies within the Piedmont Physiographic Province of New Jersey (Fenneman, 1938). The following contains a brief description of the surficial and bedrock geology of the Site. More extensive information is presented in the RI Report.

1.3.3.1. Surficial Geology

Quaternary and pre-Quaternary glacial and glacial-fluvial deposits overlie bedrock across much of the northern portion of New Jersey. Based on regional surficial geologic mapping for the area, unconsolidated deposits in the vicinity of the Site include sandy, silty clay to clayey, silty sand containing some shale, mudstone, and sandstone fragments. As shown on Figure 4-1 in the RI Report, these deposits are associated with recent alluvial and wetland (swamp and marsh) deposition and earlier glaciofluvial plain deposits. Extensive eolian (wind-driven) deposits are present to the west of the Site, derived from the earlier glaciofluvial plain deposits to the north and east of the Site. Surficial deposits underlying the Site are generally identified as regolith derived from weathering of shale, mudstone, and sandstone. The unconsolidated deposits are up to 30 feet thick regionally, but are generally less than 10 feet thick (FWENC, 2002) in the vicinity of the Site.

1.3.3.2. Bedrock Geology

The Site is located within the Newark Basin, which is a tectonic rift basin that covers roughly 7,500 square kilometers extending from southern New York through New Jersey and into southeastern Pennsylvania. The basin is filled with Triassic-Jurassic sedimentary and igneous rocks that are tilted, faulted, and locally folded.

The Passaic Formation (historically known as the Brunswick Formation) occupies an upper unit of the Newark Supergroup rocks in the Triassic-Jurassic Newark Basin and is the thickest and most aerially extensive unit in the Newark Basin. This formation consists of mostly red cyclical lacustrine clastics including mudstone, siltstone, and shale, with

minor fluvial sandstone (Michalski and Britton, 1997). The reddish color originates from reworked hematite, which occurs in 5-10 percent of the unit. The Site is located immediately south of the contact between the Passaic Formation mudflat deposits, which are a thickly bedded mudstone, and the Passaic Formation, which is often thinly bedded sandstone and siltstone.

1.3.3.3. OU3 Geology

Unconsolidated deposits at the former CDE facility range in thickness from 0.5 to 15 feet and generally thicken to the east towards Bound Brook. Natural unconsolidated materials, consisting primarily of red-brown silt and sand with silt and clay layers, are generally intermixed with urban fill materials (including cinders, ash, brick, glass fragments, metal, and other detritus) throughout the former CDE facility and vicinity. A thin (surface to 15 feet bgs) layer of weathered bedrock overlies competent bedrock, consistent with the weathered bedrock identified by regional surficial geologic mapping. This material primarily consists of heavily weathered siltstone and shale material with a heterogeneous texture ranging from silt to fine sand, with some zones of angular, silty gravel and silty clay.

The top of competent bedrock underlying the former CDE facility ranges from 4 to 15 feet bgs, except in the northwestern portion of the facility where bedrock was present immediately beneath the building foundations. Based on boring log data for wells installed during the RI (See Appendix D in the RI Report), the bedrock at the Site consists primarily of red-brown to dark brown mudstone, siltstone, and shale consistent with the upper Passaic Formation. Boring logs from wells to the north of the former CDE facility are generally indicative of Passaic Formation mudstone facies, while cores from the former CDE facility and areas southwest and east of the facility show siltstone and shale. The bedrock units range from massive rock with few features to highly laminated beds. The bedrock units are consistently fine-grained in texture, with numerous calcified veins and vugs throughout. Bedrock associated with the older Lockatong and Stockton formations was not encountered in bedrock cores from OU3.

Bedrock boring logs and borehole acoustical televiewer data (See Appendix F in the RI Report) indicate that numerous fracture zones are present in the bedrock from the surface to approximately 600 feet bgs, the maximum drilled depth. The shallow bedrock units are heavily fractured and weathered, with significant shallow fracture in-filling with weathered material ranging in texture from silt/clay to sand. Shallow fractures are generally more open in the shallow bedrock and become less open with depth. The bedrock contains heavily fractured zones that occur along the bedding planes (parallel to

sub-parallel). Weathered fracture zones within the bedrock ranged from near horizontal to near vertical. Pole to plane projections of the fracture data interpreted from the acoustical televiewer data (See Appendix F, Figure F-1 in the RI Report) show that the majority of these features are relatively low angle, ranging from 10 to 30 degrees from horizontal, consistent with the regional character of the Passaic Formation.

1.3.4. Hydrogeology

The following contains a brief description of the regional and OU3 hydrogeology. More extensive information is presented in the RI Report.

1.3.4.1. Regional Hydrogeology

The Passaic Formation contains an aquifer that is used as a source of potable water for some of the communities surrounding the former CDE facility. Numerous private, industrial, and municipal wells tap the formation, with reported pumping rates that range from a few to several hundred gallons per minute. The Passaic Formation generally forms tabular aquifers and confining units that are several tens of feet thick. Groundwater movement is primarily through bedding plane fractures and steeply dipping interconnected fractures and dissolution channels (secondary permeability). A very limited amount of groundwater flows through the interstitial pore spaces between silt or sand particles because of compaction and cementation of the formation (primary permeability). Differences in permeability between layers resulting from variations in fracturing and weathering may account for many water bearing units.

Groundwater in the Passaic Formation is often unconfined in the shallower, more weathered part of the aquifer and confined in the deeper part of the aquifer. Silt and clay derived from the weathering process typically fill fractures, thereby reducing permeability. This relatively low permeability surface zone reportedly extends 50 to 60 feet bgs (Michalski, 1990). Groundwater in the deeper portion of the Passaic Formation is generally confined. Recharge is by leakage through fractures in the confining units. Local and regional groundwater discharge boundaries include surface water bodies like Bound Brook. However, municipal pumping centers (water wells) account for most of the regional groundwater discharge.

1.3.4.2. OU3 Hydrogeology

The bedrock aquifer in OU3 is separated into three hydrogeologic units or water bearing zones, identified as the “shallow”, “intermediate”, and “deep” water bearing zones.

The shallow water bearing zone is unconfined and extends from the water table to a depth of approximately 120 feet bgs (bedrock). As described above, the water table fluctuates from the unconsolidated deposits into bedrock due to many factors including seasonal precipitation and the effects of nearby pumping. The groundwater encountered in the unconsolidated deposits is interpreted as part of the shallow unconfined bedrock aquifer. The shallow water bearing zone is potentially hydraulically connected to surface water bodies such as Bound Brook, Cedar Creek, and Spring Lake. The intermediate and deep water bearing zones, located below 120 feet bgs, are confined.

Groundwater movement in the highly fractured shallow water bearing zone behaves like an equivalent porous medium (EPM) (e.g., sand and gravel aquifer). This is evidenced by the Theisian behavior of the aquifer in response to pumping during the Integrated Pumping Test (See Section 5.12, Appendix L of the RI Report). Groundwater movement in the intermediate and deep water bearing zones also has some characteristics of an EPM; however, there is some evidence that the lack of horizontal and vertical fractures in some locations influence groundwater movement. Each of these water bearing units is described below.

Shallow Water Bearing Zone: The shallow water bearing zone is monitored by the uppermost port in each of the multi-port systems and the shallow bedrock wells constructed at the former CDE facility. An evaluation of current shallow bedrock groundwater levels compared to those collected during previous investigations indicate that current shallow bedrock aquifer water levels are approximately five feet higher than they were during the Foster Wheeler RI (FWENC, 2001b). The water level variations are interpreted to be the result of historical groundwater pumping near Spring Lake, which was gradually reduced and ultimately stopped in 2003.

Intermediate Water Bearing Zone: The intermediate water bearing zone marks the transition between the shallow and deep water bearing zones. This zone is interpreted to be confined and is monitored by the ports in each of the multi-port systems between 120 feet and 160 feet bgs. The fractures in the intermediate water bearing zone exhibit less in-filling with sediment and exhibit an increased permeability in individual fractures as compared to the shallow water bearing zone.

Deep Water Bearing Zone: The deep water bearing zone is confined and exhibits an increased permeability, due to fractures being more open with less in-filling of material due to weathering. This zone is monitored by the ports in each multi-port system between 200 and 240 feet bgs. This depth range was selected to characterize the deep water

bearing zone because it has a dense network of ports, which facilitates data contouring and interpretation.

A plot of groundwater elevations collected in July 2010 from the shallow bedrock wells and the most shallow sampler port in each of the multi-port wells was used to characterize the shallow water bearing zone (See RI Report, Figure 4-5). The data show that the potentiometric surface is generally controlled by elevation, with groundwater in the shallow water bearing zone potentially discharging to Bound Brook, Cedar Brook, and Spring Lake. Groundwater in the shallow water bearing zone forms a mound at the former CDE facility, moving north and east from the facility toward Bound Brook, and northwest toward the low-lying area at the confluence of Bound Brook and Cedar Brook. Groundwater elevations in wells MW-19, MW-20, and MW-21 in the northwestern portion of OU3 reflect the influence of the Park Avenue wellfield. To the northeast of the former CDE facility, immediately across Bound Brook, groundwater movement in the shallow water bearing zone is generally toward the west.

A plot of groundwater elevations from multi-port sampler ports located between 120 and 160 feet bgs was used to characterize the intermediate water bearing zone (See RI Report, Figure 4-6). Groundwater movement in this zone is primarily to the north.

A plot of groundwater elevations from multi-port sampler ports between 200 and 240 feet bgs were used to characterize the deep water bearing zone (See RI Report, Figure 4-7). Groundwater movement in this zone is primarily to the north.

1.3.5. Demography and Land Use

South Plainfield is located at 40°34'51"N, 74°24'50"W and is bordered by Piscataway on the south and west, Edison on the east, and Plainfield on the north. The former CDE facility is currently zoned for commercial/industrial use. As shown on Figure 1-4, land uses surrounding the former CDE facility are primarily commercial/light industrial to the northeast and east, residential to the south and north, and mixed residential/commercial to the west. The area within 1.5 miles of the former CDE facility contains eight schools and five parks. Two elementary schools are located approximately 2,000 feet from the former CDE facility (one to the north and the other to the south).

According to the 2006 Census, South Plainfield has an estimated population of approximately 22,795 people with a total land area of approximately 8.4 square miles (city-data.com), of which 8.36 square miles (99.52%) is land and 0.04 square miles

(0.48%) is water. South Plainfield's population includes Caucasian (78%), African American (9%), Asian (8%), and Hispanic and other racial and ethnic groups (5%).

1.4. Baseline Human Health Risk Assessment Overview

This BHHRA is an evaluation of potential human health risks associated with chemicals detected in groundwater. The BHHRA follows the four-step process typically used to assess potential human health risks (USEPA, 1989; NRC, 1983). The four steps are:

Data Evaluation: Relevant groundwater data are compiled and analyzed to determine the usability of the data and to select chemicals of potential concern (COPC) in groundwater.

Exposure Assessment: Actual and/or potential chemical release and transport mechanisms are identified, potentially-exposed human populations and possible exposure pathways are described, concentrations of COPCs at potential points of human exposure are determined, and human exposures to the COPCs are estimated.

Toxicity Assessment: Qualitative and quantitative toxicity information for each COPC are summarized and toxicity values used to characterize risks are identified.

Risk Characterization: The likelihood and magnitude of adverse health effects, in the form of non-cancer hazard quotients and incremental lifetime cancer risks, are estimated. Sources of uncertainty in the BHHRA are noted and discussed.

2. Data Evaluation

The data evaluation focuses on the compilation of usable chemical data and the selection of COPCs in groundwater. The data described below were used to calculate representative chemical concentrations to which humans may be exposed, through the pathways described in RAGS Part D Table 1 (see Appendix A). While historical data from previous OU3 investigations are summarized herein, they were not included in the quantitative assessment of human health risks.

Groundwater samples are available from the twelve shallow bedrock wells and eight deep bedrock wells³ discussed in Section 1.2, in addition to thirteen deep bedrock wells (MW-13, MW-14S, MW-14D, MW-15S, MW-15D, and MW-16 through MW-23) installed as FLUTETM wells from January 2009 to December 2010 and a former production well (FPW) that was discovered during field investigations and converted to a FLUTETM well in October 2009. Table 2-1 lists the groundwater monitoring wells and screened interval for each shallow bedrock well or FLUTETM well sampler port. In general, groundwater samples were collected from between two and nine discrete depth intervals in each FLUTETM well. Figure 2-1 depicts the location of each groundwater monitoring well on the Site.

Groundwater samples were collected from all wells in October 2009 and March-April 2010 and were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals (including mercury), and cyanide. Groundwater samples were collected from a subset of 24 wells in March-April 2010 and July 2010 for PCB congener and dioxin/furan analyses. The 24 shallow bedrock wells or FLUTETM well sampler ports from which samples for PCB congener and dioxin/furan analyses were collected are noted on Table 2-1. Generally, selection of the individual wells/ports for PCB congener and dioxin/furan analyses was based on the positive (i.e., detected) concentrations of PCB Aroclors in groundwater samples from October 2009 and the spatial distribution (horizontal and vertical) of the wells/ports selected for analysis. In December 2010 and March 2011, groundwater samples were collected from only the newly-installed MW-23 and were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals (including mercury), and cyanide.

³ ERT-7 was converted into a FLUTETM well in September 2009.

2.1. Data Usability

Table 2-2 presents a summary of analytical methods and data validation performed for the groundwater samples described above. As indicated, the samples were analyzed by USEPA Contract Laboratory Program (CLP) statements of work. The analytical data were validated by the USEPA, Region 2 Hazardous Waste Support Branch. Generally, the data characteristics used to satisfy the quality assurance/quality control requirements included precision, accuracy, representativeness, comparability, detection limit verification, and blank contamination elimination or qualification. Based on review of the available data validation reports, the majority of the groundwater data is of acceptable quality overall but subject to the data validator's qualifying remarks.

Following review of the validated PCB congener data from samples collected in March-April 2010 and July 2010, it was decided not to use the March-April 2010 PCB congener data from MW-11 in this BHHRA. These data were qualified by the USEPA data validator as non-detect at elevated reporting limits due to method blank and equipment rinseate blank contamination.⁴ Therefore, it was decided to use only the July 2010 PCB congener data from MW-11. In addition, because the PCB congener data are evaluated on the basis of their toxicity relative to that of 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD) and factor into the calculation of 2,3,7,8-TCDD toxic equivalence (termed 2,3,7,8-TCDD TEQ), the March-April 2010 dioxin/furan data from MW-11 also were not used in this BHHRA.

Given the relatively elevated concentrations of some chemicals detected in groundwater samples from monitoring wells on the former CDE facility, an evaluation of reporting limits for non-detected chemicals was carried out. This was completed to address concerns that the laboratory analysis of chemicals present at elevated concentrations (specifically the peaks of these chemicals and dilutions performed to bring them within the calibration range) may have masked the presence and affect interpretation of the distribution of other chemicals in groundwater.

Table 2-3 presents the range of reporting limits for chemicals qualified as non-detect. The maximum reporting limits are compared to the chemical-specific USEPA Regional Screening Levels (RSL) for tapwater (USEPA, 2011a), where available, which are the

⁴ The MW-11 samples collected from the same depth intervals in July 2010 revealed positive concentrations. For more information on the review of the PCB congener data, refer to the Draft RI Report Appendix K.3, Cornell-Dubilier OU3 Groundwater Event 2 Quality Control Summary Report.

screening toxicity values used to identify COPCs in this BHHRA. The RSLs are based on either a target non-cancer hazard quotient (HQ) of 0.1 or a target cancer risk of one-in-a-million (10^{-6}). A range of human health risk-based screening values is also presented, consistent with the evaluation of reference limits presented in Worksheet #15 of the Quality Assurance and Project Plan (QAPP) for OU-3 (Malcolm Pirnie, 2008a). For RSLs based on non-cancer health effects, the range of screening values is based on a target non-cancer HQ of 0.1 and 1. For the cancer risk-based RSLs, the range of screening values is based on a target cancer risk level of 10^{-6} and 10^{-4} .

As shown in Table 2-3, the maximum reporting limit for some chemicals exceeds the corresponding USEPA RSL for tapwater. For VOCs, PCB Aroclors, and pesticides, the reporting limits are consistently greater than the RSLs, even where the RSLs are alternatively presented on an HQ basis of 1 or cancer risk basis of 10^{-4} . The reporting limits for approximately half of the non-detected SVOCs do not exceed the RSLs, and where the reporting limit is greater than the RSL based on either an HQ of 0.1 or cancer risk of 10^{-6} , most are within the range of risk-based screening levels presented. Given this evaluation, it is possible that elevated detection limits may have masked the presence of individual VOCs, PCB Aroclors, and pesticides. However, it is not likely that this source of uncertainty will affect the RI/FS conclusions.

2.2. Historical Groundwater Data Evaluation

Historical groundwater data were not used in the quantitative assessment of human health risks. However, they were evaluated by comparing maximum detected concentrations to USEPA RSLs for tapwater.

Appendix B, Table B-1 lists the shallow, unconsolidated groundwater samples (referred to as “shallow bedrock groundwater,” “test pit seep,” and “perched groundwater”) collected by Foster Wheeler from June to October 2000. As shown, shallow bedrock groundwater samples are from the twelve monitoring wells (MW-01A, MW-02A, and MW-03 through MW-12) and “former Production Well Number 3” (two depths, shallow and deep) located at the former CDE facility. Groundwater samples from all wells were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals, and cyanide. Samples from MW04, MW09, and MW11 were also analyzed for PCB congeners and dioxins/furans. A summary of Foster Wheeler’s shallow bedrock groundwater data is presented in Appendix B, Table B-2. Results of duplicate samples collected from MW11 were averaged with those of the corresponding originals.

A summary of Foster Wheeler's test pit seep and perched groundwater data is presented in Appendix B, Table B-3. Groundwater encountered during excavation of the test pits was sampled using a clean glass bottle clipped to a steel pole or attached to a wire line (FWENC, 2001b). These groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, metals, and cyanide. Groundwater encountered during drilling of the monitoring well boreholes for MW-01 through MW-12 was collected using a disposable polyethylene bailer through hollow stem augers, and samples were analyzed for VOCs and PCB Aroclors (FWENC, 2001b).

A summary of the shallow and deep bedrock groundwater data collected by the USEPA in 2008 is presented in Appendix B, Table B-4. As described in Section 1.2, the USEPA collected groundwater samples from seven FLUTETM wells and twelve shallow bedrock monitoring wells. Groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCB Aroclors, and metals. In Table B-4, results of duplicate samples were averaged with those of the corresponding originals.

The list of VOCs, SVOCs, pesticides, PCB Aroclors, and metals detected in historical groundwater samples from the former CDE facility is consistent with those detected in groundwater samples collected across the Site during this RI. The chemicals that would be identified as COPCs based on comparison to the USEPA RSLs for tapwater is also similar to the list of COPCs identified using the more recent groundwater data. Therefore, the potential for adverse health effects from exposure to the chemicals detected in historical groundwater samples was addressed by the quantitative evaluation presented in this BHHRA.

2.3. Groundwater Exposure Units

As described in OU3 Hydrogeology (Section 1.3.4.2), the bedrock aquifer was divided into "shallow," "intermediate," and "deep" water bearing zones to describe the hydrogeology and distribution of contamination. The shallow bedrock aquifer is unconfined, and groundwater movement is generally controlled by elevation, with evidence of potential shallow groundwater discharge to Bound Brook. Groundwater movement in the intermediate and deep water bearing zones is primarily to the north. These zones do not exhibit evidence of potential groundwater-surface water interaction.

Consistent with this conceptual understanding of OU3 hydrogeology and to facilitate evaluation of the potential for human exposure through the pathways described in RAGS Part D Table 1, multiple groundwater exposure units were established for this BHHRA. The first exposure unit consists of the entire aquifer. A second exposure unit consists

only of shallow groundwater, generally defined as groundwater from the shallow bedrock monitoring wells and the most shallow sampler port in each of the FLUTETM multi-port wells. Shallow groundwater was further separated into onsite⁵ and offsite exposure units, because relatively higher chemical concentrations were detected in groundwater samples from the onsite monitoring wells. Lastly, because there is evidence of potential shallow groundwater discharge to Bound Brook, offsite groundwater was further separated into two exposure units relative to (i.e., north or south of) Bound Brook.

In summary, the following groundwater exposure units were established for the purposes of this BHHRA:

- Entire aquifer – includes groundwater data from all wells and across all sample depths. However, groundwater data from ERT-8 was not included, because it is an upgradient well considered representative of background conditions.
- Shallow onsite groundwater data – includes groundwater data from the shallow bedrock monitoring wells and the most shallow sampler port in each multi-port well located within the former CDE facility property boundary.
- Shallow offsite groundwater data, south of Bound Brook – includes groundwater data from the most shallow sampler port in each multi-port well located outside the former CDE facility property boundary and south of Bound Brook. Groundwater data from ERT-8 were not included, because it is an upgradient well considered representative of background conditions.
- Shallow offsite groundwater data, north of Bound Brook – includes groundwater data from the most shallow sampler port in each multi-port well located outside the former CDE facility property boundary and north of Bound Brook.

Table 2-4 lists the monitoring wells included in each of the three shallow groundwater data sets.

Based on the direction of groundwater flow, as shown on potentiometric surface maps, and on the current understanding of the historical pumping of nearby wellfields, the RI Report established that aqueous mass from the former CDE facility has been interpreted to not extend to ERT-5 and ERT-6 in the intermediate zone, and MW-18 in the deep

⁵ In this case and throughout the BHHRA, “onsite” and “offsite” refer to locations relative to the property boundary of the former CDE facility.

zone. Therefore, data from these offsite wells, located west of the former CDE facility, were excluded from the delineated aqueous mass in Figures 5-12 and 5-13 of the RI Report. Regardless, these wells were included in the “entire aquifer” and “shallow offsite groundwater, south of Bound Brook” data sets evaluated in this BHHRA. To determine the contribution that groundwater data from these wells make to the baseline cancer risks and non-cancer hazards estimated in this BHHRA, a separate evaluation of the groundwater data from only ERT-5, ERT-6 and MW-18 is presented in the Uncertainty Evaluation.

2.4. Selection of COPCs in Groundwater

To focus the BHHRA on those chemicals that, if contacted, have the greatest potential to pose human health risks, the list of detected chemicals in each groundwater exposure unit was narrowed to a list of COPCs, according to the following screening process:

- Chemicals designated by the USEPA as Class A or known human carcinogens were identified as COPCs regardless of the other selection criteria. The following chemicals in groundwater are Class A carcinogens: benzene, vinyl chloride, arsenic, and chromium VI (used as a conservative screen for total chromium sample results).
- Detected chemical concentrations were compared to the USEPA RSLs for tapwater (USEPA, 2011a). The RSLs for tapwater are protective of chronic exposures via ingestion and inhalation (of volatile chemicals only) routes; exposure via dermal contact was not included in the derivation of RSLs for tapwater. The RSLs are based on a target cancer risk of 10^{-6} or a target non-cancer HQ of 1. Consistent with USEPA, Region 2 guidance for screening sites with multiple contaminants, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Chemicals with maximum concentrations greater than the screening levels were identified as COPCs.
- The essential nutrients (i.e., calcium, magnesium, potassium, and sodium) were categorically eliminated as COPCs.
- Finally, following USEPA (1989) guidance, for sample sizes greater than or equal to 20, if the detection frequency of a chemical was less than 5% and chemical contamination was not biased toward any given area, it was eliminated as a COPC.

The OU3 groundwater data summaries and selection of COPCs in each exposure unit are presented in RAGS Part D Tables 2.1 to 2.4 (see Appendix A). The range of detected concentrations, data qualifiers, location of maximum detected concentration, frequency of detection, range of detection limits, concentration used for screening, screening toxicity value (i.e., USEPA RSL), COPC flag, and the rationale for elimination or selection of a chemical as a COPC are provided. Background values presented in RAGS Part D Table 2s are detected concentrations in ERT-8. The background values and potential ARARs/TBCs (Applicable or Relevant and Appropriate Requirements/To Be Considered) were presented for information purposes only. The groundwater COPCs that were evaluated in this BHHRA are summarized by exposure unit in Table 2-5.

A few of the detected chemicals did not have RSLs. With few exceptions, chemicals without RSLs were retained as COPCs; they were only eliminated as COPCs where they were infrequently detected (as defined above).

RSLs were not available for PCB congeners and were only available for two individual dioxin/furan congeners: 2,3,7,8-TCDD and 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin (HxCDD). Rather than evaluating each PCB congener and dioxin/furan congener separately, the current practice recommended by the USEPA (2010b) is to assess mixtures of dioxins/furans and PCBs that exhibit dioxin-like toxicity on the basis of their predicted toxicities relative to what is known about the toxicity of 2,3,7,8-TCDD. Twelve PCB congeners and seventeen dioxin/furan congeners have been assigned 2,3,7,8-TCDD toxic equivalence factors (TEF) according to the 2005 World Health Organization (WHO) TEQ weighting scheme (USEPA, 2010b). Within a sample, detected PCB congener and dioxin/furan congener concentrations were multiplied by the congener-specific TEF, and the sum of the adjusted concentrations was calculated as 2,3,7,8-TCDD TEQ. For this reason, the groundwater data tables (i.e., RAGS Part D Table 2s) present a summary of PCB congeners and dioxin/furans on a 2,3,7,8-TCDD TEQ basis. The toxicity values used to evaluate the potential for human health risk were specific to 2,3,7,8-TCDD.

While the RAGS Part D Table 2s present summaries for the individual PCB Aroclor mixtures (e.g., Aroclor 1248) detected in groundwater, the sum of detected PCB Aroclor concentrations within a sample was calculated and used in the human exposure calculations. The toxicity values used to evaluate the potential for human health risk were specific to Aroclor 1254 or total PCBs, as available.

3. Exposure Assessment

The objective of the exposure assessment is to estimate the type and magnitude of human exposure to the COPCs in groundwater. The human exposure scenarios evaluated in this BHHRA are based on the anticipated future commercial/industrial use of the former CDE facility and the current and most likely future land uses at the Site, as described in Section 1.3.5.

In addition, a well search for a 1-mile radius of the former CDE facility was performed in October 2009 by the NJDEP Bureau of Water Systems and Well Permitting. Wells for commercial, domestic, irrigation, industrial, public non-community, and public supply uses are located within 1 mile of the former CDE facility. Figure 3-1 shows the locations of these wells relative to the OU3 groundwater monitoring wells on the Site.

3.1. Chemical Release and Transport Mechanisms

As described previously, CDE reportedly disposed of PCB-contaminated materials and other hazardous substances directly on facility soils. Therefore, facility soils are considered the primary source of contamination at the Site. Secondary release mechanisms that can facilitate the migration of chemicals include infiltration and percolation through soils to groundwater, vapor emissions to indoor and outdoor air, and potential groundwater migration/discharge to surface water and sediment of nearby wetlands and surface water bodies (e.g., Bound Brook).

3.2. Potential Exposure Pathways and Potentially-Exposed Populations

This BHHRA focuses on groundwater as a secondary source of contamination. Evaluation of the groundwater pathway considers the following:

- The potential for contact with dissolved chemicals during either potable or non-potable use of the groundwater in or on residential, commercial/industrial, and other properties throughout the Site.
- Vapor emissions to outdoor air on properties throughout the Site. This may occur following passive diffusion of volatile chemicals from groundwater through the bedrock and overburden materials to outdoor ambient air, or from volatilization

off of pooled groundwater surfaces exposed to ambient air, such as in a utility trench or other excavation. Due to the uncertainties associated with quantitatively modeling ambient air concentrations following volatilization from groundwater that may include DNAPL in fractured bedrock, the pathway by which volatile chemicals migrate through the bedrock and overburden to outdoor ambient air was qualitatively evaluated. The latter pathway by which volatile chemicals may be released from groundwater that pools at the bottom of an excavation was quantitatively evaluated.

Generally, the exposure concern with potable use of groundwater is the potential for ingestion of chemicals detected in the groundwater and inhalation of and dermal contact with chemicals in the groundwater during routine household uses (e.g., bathing, cleaning). Non-potable use of the groundwater may be for sanitary, process, irrigation, or other non-consumptive purposes. The exposure concern with non-potable use of the groundwater is the potential for dermal contact with and inhalation of chemicals in the groundwater.

The potential for adverse health effects from inhalation exposure to volatile chemicals that may migrate from groundwater to indoor air through cracks in building foundations was not evaluated in this BHHRA. This exposure pathway is being addressed by the USEPA, separate from this RI. In addition, the potential for exposure to chemicals in groundwater that migrates to surface water and sediment of Bound Brook was not evaluated in this BHHRA. These exposure pathways will be addressed during the RI for OU4.

The potential for exposure was evaluated for a number of current and future scenarios outlined in RAGS Part D Table 1 (see Appendix A). The scenario time frame, medium, exposure medium, exposure point, receptor population, receptor age, exposure route, type of analysis and rationale for selection or exclusion of an exposure pathway are provided.

The following receptor populations may be exposed to COPCs in groundwater:

Current/Future Scenario

- Commercial/Industrial Workers: (adults) who perform work within and outside the boundaries of the former CDE facility. Based on the well search, potable, sanitary, and/or process use of groundwater is possible. Potential exposure pathways and routes of exposure for commercial/industrial workers are dermal

contact and inhalation of chemicals in groundwater.⁶ In addition, exposure to volatile chemicals that migrate from groundwater to outdoor air may occur.

- Residents: (adults) who may live outside the boundaries but within the vicinity of the former CDE facility. Based on the well search, potable use of groundwater is possible. Potential exposure pathways and routes of exposure for adult residents include ingestion, dermal contact, and inhalation of chemicals in groundwater. In addition, exposure to volatile chemicals that migrate from groundwater to outdoor air may occur.
- Residents: (children, aged 0-6 years) who may live outside the boundaries but within the vicinity of the former CDE facility. Based on the well search, potable use of groundwater is possible. Potential exposure pathways and routes of exposure for child residents include ingestion, dermal contact, and inhalation of chemicals in groundwater. In addition, exposure to volatile chemicals that migrate from groundwater to outdoor air may occur.
- Construction/Utility Workers: (adults) who may perform short-term intrusive work for construction or utility installation, maintenance, or repair. Construction/utility workers may be exposed to chemicals in shallow groundwater encountered during subsurface excavations. Depths of perched water zones encountered by Foster Wheeler were variable across the former CDE facility, but they typically occurred in the range of 4 to 8 feet bgs. Potential exposure pathways and routes of exposure include dermal contact with chemicals in groundwater (e.g., that infiltrates and pools at the bottom of an excavated trench) and inhalation of volatile chemicals that may migrate from pooled groundwater to outdoor air above an excavation. In addition, exposure to volatile chemicals that migrate from groundwater to outdoor air may occur.

3.3. Data Utilization

In utilizing the analytical data to derive representative EPCs to which humans may be exposed, analytical results of duplicate samples were averaged with those of the corresponding originals. In calculating the arithmetic average of original and duplicate

⁶ The potential exposure of commercial/industrial workers through ingestion of potable groundwater was not evaluated in this BHHRA. Due to the greater frequency and duration of exposure, evaluation of ingestion exposures to resident adults and children is considered protective of commercial/industrial workers as well.

samples, if a COPC was present in one sample but non-detect in the other, the COPC was assumed to be present in the non-detect sample at a concentration equivalent to one-half the sample reporting limit. Data assigned a qualifier, indicating that the numerical value is an estimated quantity or that the identity and quantity are based on presumptive evidence, were treated the same way as data without such qualifiers.

3.3.1. COPC Concentrations in Groundwater

Representative EPCs were calculated from the available/useable groundwater data sets described above. To evaluate the exposure of commercial/industrial workers and resident adults and children, EPCs were derived using the entire aquifer data set, assuming that groundwater from across the Site is in communication. This approach may overestimate exposure to resident adults and children, because residential exposure to potable groundwater is not expected to occur inside the former CDE facility boundaries.⁷ To evaluate the exposure of construction/utility workers, EPCs were derived for each of the three shallow groundwater data sets.

The USEPA (1992a, 1989) recommends that the arithmetic average concentration of the data be used for evaluating long-term exposure and that, because of the uncertainty associated with estimating the true average concentration at a site, the 95% upper confidence limit (UCL) on the arithmetic average be used as the EPC. The 95% UCL concentration provides reasonable confidence that the true average will not be underestimated. The USEPA also indicates that where there is a question about the distribution of the data, a statistical test should be used to identify the best distributional assumption for the data set (USEPA, 1992a).

The ProUCL® 4.1.00 (ProUCL) program developed by the USEPA's Technology Support Center for Monitoring and Site Characterization was used to plot the data, test the distributional assumptions, and calculate 95% UCL concentrations. When entering data into ProUCL, if a COPC was not detected in a sample, the sample reporting limit was entered as a proxy concentration and the sample result was coded as non-detect. ProUCL contains rigorous parametric and nonparametric statistical methods that can be

⁷ Groundwater data from only the onsite monitoring wells, across all depths, was not quantitatively evaluated as a separate "entire aquifer" exposure unit in this BHHRA. While chemicals were detected at relatively elevated concentrations in the onsite vs. offsite monitoring wells, and there is the potential for future potable use of groundwater within the former CDE facility boundaries (however unlikely), it was assumed detected concentrations are elevated enough that the potential for human health risks is evident without quantifying exposure and risk. To illustrate, groundwater data from only the onsite wells, across all depths, were summarized and presented in Appendix C.

used on full or uncensored data sets and on data sets with below detection limit observations (also called left-censored data sets). Depending on the distribution and 95% UCL estimation method, ProUCL will use only detected data or will incorporate detection limits (USEPA, 2010a). In instances where the 95% UCL concentration calculated by ProUCL was greater than the maximum detected concentration (e.g., 2,3,7,8-TCDD TEQ in the shallow onsite groundwater data set), the maximum detected concentration was retained as the EPC.

The EPCs for the COPCs in groundwater are presented in RAGS Part D Tables 3.1 to 3.4 (see Appendix A). The ProUCL output sheets (i.e., box plots and UCL concentrations) for the individual COPCs are provided in Appendix D.

Evaluation of the box plots indicated the presence of potential upper-end statistical outliers (either relatively elevated concentrations or sample reporting limits) in a number of groundwater data sets. These potential outliers were not removed from the data sets used to calculate EPCs.⁸ However, it was further observed that PCB Aroclors (1248, 1254) were detected in a few samples at concentrations greater than their aqueous solubility limits and may therefore be present in those particular samples as non-aqueous phase liquid (NAPL).⁹ The total PCB Aroclor concentrations for those samples were selectively removed from the applicable groundwater data sets. The following table summarizes information on the particular samples, total PCB Aroclor concentrations removed, aqueous solubility limits, and affected groundwater data sets.

⁸ The majority of relatively elevated chemical concentrations were detected in a few wells located within the former CDE facility boundary. These concentrations were included in the entire aquifer and shallow groundwater data sets used to calculate baseline cancer risks and non-cancer hazards representative of exposure across the Site. This is a conservative evaluation, as the RI Report established the majority of aqueous mass has diffused into the rock matrix, and that ongoing attenuation processes will likely limit additional aqueous mass redistribution. To determine the relative contribution the elevated concentrations have to the baseline cancer risks and non-cancer hazards (and thereby better approximate cancer risks and non-cancer hazards from exposure to groundwater outside the former CDE facility property boundary), an alternate evaluation that excludes data from a few onsite monitoring wells is presented in Section 5.2, Discussion of Cancer Risks and Non-cancer Hazards.

⁹ As indicated in Section 5 of the RI Report, the presence of NAPL in MW-14, at the very least, was indicated by the reactive liner and groundwater sample results.

	Aqueous Solubility Limit *	October 2009	March/April 2010	
		MW-14S-04	MW-11	MW-14S-02
Aroclor 1248	100	7,300	Not Detected	Not Detected
Aroclor 1254	43	5,600	190	71
Total PCB Aroclors	--	12,900	190	101
Affected data set:		Entire Aquifer	Entire Aquifer; Shallow Onsite	Entire Aquifer

Notes:

Concentration units are µg/L.

*USDOE, 2011

Similarly, further evaluation of the PCB congener data revealed concentrations that are also likely greater than aqueous solubility and therefore indicate the presence of NAPL. Total detected PCB congener concentrations were calculated and compared to the solubility limit for Aroclor 1254 (i.e., 43 µg/L). The following table summarizes information on the particular samples, total detected PCB congener concentrations, corresponding 2,3,7,8-TCDD TEQ concentrations removed, and affected groundwater data sets.

	Aqueous Solubility Limit *	March/April 2010		July 2010		
		MW-12	MW-14S-04	MW-11	MW-12	MW-14S-04
Total PCB Congeners	43	1,504	67,666	321	222	80,753
2,3,7,8-TCDD TEQ	—	5.0E-04	2.1E-01	8.4E-04	1.0E-04	2.2E-01
Affected data set:		Entire Aquifer; Shallow Onsite	Entire Aquifer	Entire Aquifer; Shallow Onsite Groundwater		Entire Aquifer

Notes:

Concentration units are µg/L.

*USDOE, 2011

3.3.2. COPC Concentrations in Air

The EPCs for the volatile COPCs in outdoor or indoor air following release from groundwater were estimated based on the EPCs for those COPCs in groundwater. The

various techniques used to estimate COPC emissions and concentrations are presented in Appendix E and summarized below.

Concentrations of the volatile COPCs in outdoor air (to evaluate potential exposure of construction/utility workers) were estimated using an emissions equation recommended by the USEPA (1995b), under the assumption that shallow groundwater infiltrates an excavation and volatile COPCs are released from pooled water at the bottom of the excavation, and the USEPA-approved Point, Area, and Line source (PAL2.1) model (USEPA, 1992b).¹⁰ As the depth to groundwater in some areas of the Site is greater than the depth a hypothetical utility trench would be, scenarios where volatile COPCs could be released from the water table and diffuse through the overlying soil before infiltrating an excavation are possible. However, evaluation of the pooled water scenario should be adequately protective of deeper water table conditions. As such, deeper water table conditions were not evaluated further.

Concentrations of the volatile COPCs in bathroom air during and after showering (to evaluate potential exposure of resident adults and children) were estimated using the “Schaum model” (Schaum et al., 1992). A modified version of the Schaum model was used to estimate concentrations of the volatile COPCs in air following emissions from process water (to evaluate potential exposure of commercial/industrial workers). The exposure scenario assumed workers may use groundwater for process/industrial activities (e.g., to wash vehicles or equipment) and volatile COPCs are emitted from the water to ambient air within a closed environment (i.e., building).

3.4. Estimates of Chemical Intake/Exposure

Estimates of chemical intake and exposure were developed to portray reasonable maximum exposure (RME) under current and future exposure scenarios. The RME scenario considers the highest exposure that might reasonably be expected to occur, one that is well above the average case of exposure but within the range of possibility. Use of RME parameter values to model baseline human health risks is a conservative approach, in that it yields upper bound cancer risk and non-cancer hazard estimates (USEPA, 1989).

¹⁰ Newer air models that allow for a more site-specific assessment of chemical emissions were made available in April 2010 (http://www.epa.gov/ttn/scram/dispersion_screening.htm#aerscreen). These models incorporate information on land use and surface characteristics specific to a site. It is unknown whether volatile chemical concentrations in air predicted by the new models would be generally greater or less than those predicted using the approach described in Appendix E. However, the air models used in this BHHRA should be sufficiently conservative for risk screening purposes.

In accordance with USEPA Region 2 guidance, if risks in excess of USEPA acceptable levels were determined for an exposure pathway, the pathway was then re-evaluated using central tendency exposure (CTE) parameter values, where applicable, in place of upper-bound values specific to the RME analysis (USEPA, 1995a).

3.4.1. Exposure Equations

The equations used to estimate human exposure are presented in RAGS Part D Tables 4.1 to 4.7 (see Appendix A). For commercial/industrial workers and residents, chronic exposures were estimated. For construction/utility workers, where the exposure duration (ED) is assumed to be one year, subchronic exposures were estimated.

3.4.1.1. Oral and Dermal Exposures

Application of the exposure equations results in daily intake for assessing oral exposure or dermally absorbed dose (DAD) for dermal contact exposure, both of which are expressed in milligrams per kilogram of body weight per day (mg/kg-day). The daily intake is the amount of chemical at the exchange boundary. A fundamental assumption in the estimate of the DAD is that absorption continues long after the exposure has ended (USEPA, 2004). Thus, the dermally absorbed dose per event (DA_{event}) is the total dose dissolved in the skin at the end of the exposure.

The exposure equations require a chemical concentration or the average concentration contacted over the exposure period (e.g., $\mu\text{g/L}$ groundwater). In this BHHRA, this is the 95% UCL concentration, where applicable, or maximum detected concentration. The equations also require a contact rate (i.e., the amount of contaminated medium contacted per unit time or event), a body weight (i.e., the average body weight over the exposure period), and an averaging time (i.e., the time period over which exposure is averaged).

The averaging time (AT) depends on the type of toxic effect being assessed. When evaluating exposures for potential non-cancer health effects, intakes and dermally absorbed doses were calculated by averaging over the period of exposure. This is equivalent to the receptor-specific ED, described below, multiplied by 365 days/year. When evaluating potential cancer risks, intakes and dermally absorbed doses were calculated by prorating the total cumulative intake over a lifetime (i.e., lifetime average daily intake). For calculation purposes, this is equal to 70 years multiplied by 365 days/year (25,500 days). This distinction is consistent with the hypothesis that the mechanism of action for each of these health effects endpoints is different. The approach

for carcinogens is based on the assumption that a high dose received over a short period of time is equivalent to a corresponding low dose spread over a lifetime.

3.4.1.2. Inhalation Exposure

Application of the equation for estimating inhalation exposure (USEPA, 2009a) results in the exposure concentration (EC), which is expressed in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and is based on the EPC for each COPC in air. The EPCs were modified to account for receptor-specific exposure parameters [e.g., ED, exposure frequency (EF), and exposure time (ET)] but do not consider receptor-specific body weight or inhalation rate. The USEPA believes this approach results in more realistic risk estimates, as the amount of chemical that reaches a target organ may not depend on body weight or inhalation rate.

The AT in the inhalation exposure equation is expressed in hours. Therefore, for evaluating potential cancer risks, the AT equals 613,200 hours (25,550 days x 24 hours/day). The AT for non-cancer health effects is equivalent to the receptor-specific ED (in years) multiplied by 365 days/year and 24 hours/day. Where the ED is much less than 1 year (e.g., for the construction/utility worker), the AT is calculated as ED (in days) x 24 hours/day (USEPA, 2009a).

3.4.2. Receptor-Specific Exposure Parameters

The exposure parameters used to model human exposure to the COPCs in groundwater under the RME scenario are described in the following sections and presented in RAGS Part D Tables 4.1.RME to 4.7.RME. A number of exposure parameter values were modified for use in the CTE evaluations, as presented in RAGS Part D Tables 4.1.CTE to 4.7.CTE. Some of these modified values (e.g., ED) are referenced to USEPA guidance, while others (e.g., EF) are based on professional judgment.

3.4.2.1. Commercial/Industrial Workers

The exposure parameters used to model commercial/industrial worker exposure to groundwater are presented in RAGS Part D Tables 4.1 and 4.2. An EF of 250 days/year and ED of 25 years were assumed (USEPA, 2002b). An event duration (t-event) [or exposure time (ET) depending on the equation] of 8 hours (USEPA, 1997b) was used, assuming that any potential washing activities occur continuously over the course of a typical 8-hour work day. The event frequency (EV) was 1 event per day (USEPA, 2002b).

The skin surface area (SA) available for dermal contact was assumed to be 3,300 cm², corresponding to the area of the face, forearms, and hands (USEPA, 2002b). An average body weight (BW) of 70 kg for an adult was used (USEPA, 2002b).

Other parameters needed to calculate DA_{event} include chemical-specific parameters, such as the fraction absorbed (FA), dermal permeability coefficient (Kp), and lag time per event (T-event). The Kp reflects movement across the skin to the underlying skin layers and into the bloodstream. The chemical-specific parameter for the ratio of Kp through the stratum corneum relative to its permeability coefficient across the viable epidermis (B) does not appear in the equation for DA_{event} for short exposure times, because DA_{event} is not a function of B at short exposure times. For short exposure times, the amount of chemical absorbed depends only on permeability of the stratum corneum. The chemical- and exposure scenario-specific factors used in the calculation of DA_{event} for the commercial/industrial worker are presented in Appendix E.

3.4.2.2. Construction/Utility Workers

The exposure parameters used to model construction/utility worker exposure to groundwater are presented in RAGS Part D Tables 4.3 and 4.4. Due to the short-term nature of construction/utility work around an excavation for utility installation, maintenance, or repair, the EF for the construction/utility worker was assumed to be 60 days, representing exposure equivalent to three work months. An ED of 1 year was used, assuming construction/utility work at a single location is unlikely and that work by the same individual is even less likely. A t-event or ET of 8 hours (USEPA, 1997b) and EV of 1 event per day (USEPA, 2002b) were also assumed.

A skin SA of 3,300 cm², corresponding to the area of the face, forearms, and hands, was assumed (USEPA, 2002b). An average BW of 70 kg for an adult was used (USEPA, 2002b). Chemical-specific factors used in the calculation of DA_{event} for the construction/utility worker appear in Appendix E.

3.4.2.3. Resident Adults and Children

The exposure parameters used to model residential exposure to groundwater are presented in RAGS Part D Tables 4.5 to 4.7. To evaluate the potable use scenario, groundwater ingestion rates (IR-W) of 2 liters/day and 1 liter/day were assumed for resident adults and children, respectively; they represent the 90th percentile values for daily water consumption by adults and infants (USEPA, 2002b). The average adult BW of 70 kg was used for the resident adult, while the average BW of 15 kg for a child (ages 0 to 6) was used for the resident child (USEPA, 2002b).

An EF of 350 days/year was used for resident adults and children, assuming 15 days away from the home over the course of a year (USEPA, 1991). EDs of 30 years (the 90th percentile time at one residence) for resident adults and 6 years for resident children were used. However, in evaluating cancer risks for resident adults, the ED of 30 years was based on 6 years at the child's rate of exposure and 24 years at the adult's rate of exposure (USEPA, 1991).¹¹

As the greatest, but not exclusive, opportunity for dermal exposure in the home is during showering or bathing, the entire surface area of the body was used to evaluate dermal exposure. Skin SAs of 18,000 cm² and 6,600 cm² were used for adults and children, respectively. These values represent the average of 50th percentile total body surface areas for adult males and females and a time-weighted average surface area for a 0 to 6-year old child using 50th percentile total body surface areas for male and female children, respectively (USEPA, 2004). ETs for dermal contact of 0.25 hours/event (i.e., 15 minutes/event) for adults during showering and 0.45 hours/day (i.e., 20 minutes/day) for children during bathing were used (USEPA, 2003a). Assuming inhalation exposures to volatile COPCs in bathroom air may occur after showering or bathing, ETs for inhalation exposure of 0.58 hours/event for adults (representing 0.25 hours showering and 0.33 hours in the bathroom after showering) and 1 hour/event for children (representing 0.45 hours bathing and 0.55 hours in the bathroom after bathing) were used (USEPA, 2004).

The USEPA (2004) recommends use of a screening procedure for evaluating dermal contact with organic COPCs in water where the receptor is also exposed via ingestion (i.e., resident adults and children). Typically following this screening procedure, an organic COPC is evaluated for the dermal contact exposure route only if exposure from dermal contact exceeds 10% of the intake from ingestion. In addition, for dermal contact with the volatile COPCs, the EPCs in groundwater were adjusted by a factor of 0.9 for the RME scenario and 0.5 for the CTE scenario (USEPA, Region 2). This adjustment accounts for the fact that as the volatile COPCs are released from the water to air, less of the VOC concentrations are available for dermal contact. Otherwise, dermal contact with groundwater was as described above. Chemical-specific factors used in the calculation of DA_{event} for the resident adults and children appear in Appendix E.

¹¹ It is recognized that for consistency, the ED for evaluating non-cancer hazards for the resident adult may be changed to 24 years. However, whether 24 or 30 years is used as the ED, the factor is canceled out by the averaging time (which is equivalent to ED*365 days) in the exposure equation, therefore yielding the same non-cancer hazard quotient.

Lastly, to evaluate cancer risks from exposure to COPCs with a mutagenic mode of action, age-adjusted exposure factors were calculated for each of the following age groups: 0-2 years, 2-6 years, 6-16 years, and 16-30 years. These calculations are presented in RAGS Part D Table 4.7, were used to calculate chemical-specific intakes and dermally absorbed doses in RAGS Part D Table 7.5 and 7.6, and facilitated application of age-dependent adjustment factors (ADAF) to toxicity values for carcinogenic COPCs with a mutagenic mode of action (further described in Section 4.2). For this reason, exposure parameters for the resident adult and resident child are presented in Table 4.7 for each year between 0 and 30 years of age.

4. Toxicity Assessment

The toxicity assessment, also termed the dose-response assessment, serves to characterize the relationship between the magnitude of exposure and the potential that an adverse health effect will occur. It involves determining whether exposure to a chemical can cause an increase in the incidence of a particular adverse health effect and characterizing the nature and strength of the evidence of causation. The toxicity information is then quantitatively evaluated and the relationship between the dose of the chemical received and the incidence of adverse health effects in the exposed population is evaluated.

The USEPA and other regulatory agencies have performed toxicity assessments for numerous chemicals, and the guidance they provide was used in this BHHRA. These include reference doses (RfD) and reference concentrations (RfC) for the evaluation of noncarcinogenic health effects from chronic and subchronic exposure to chemicals and cancer potency slope factors and unit risk factors for evaluating incremental cancer risk from exposure to chemicals prorated over a lifetime. Sources of toxicological information and toxicity values, in order of preference consistent with USEPA (2003c) guidance, include:

- Tier 1 - Integrated Risk Information System (IRIS) (USEPA, 2011b). IRIS is an internet database that has received internal and external scientific review and contains current information on human health effects that may result from exposure to chemicals in the environment. IRIS was accessed at:
<http://www.epa.gov/iris>
- Tier 2 - Provisional Peer-Reviewed Toxicity Values (PPRTV). PPRTVs were developed by the USEPA Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center and are available as chemical-specific issue papers at the following website:
<http://hhpprtv.ornl.gov/>.
- Tier 3 - Additional USEPA and non-USEPA sources of toxicity information, including but not limited to the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment's chronic reference exposure levels and cancer potency values, the Agency for Toxic Substances and

Disease Registry (ATSDR) minimal risk levels, and toxicity values published in the USEPA Health Effects Summary Tables (HEAST) (USEPA, 1997a).

4.1. Noncarcinogenic Effects from Chronic Exposure to COPCs

The USEPA (1990) indicates that acceptable exposure levels for chemicals with non-cancer health effects should represent concentration levels to which the human population, including sensitive subpopulations (e.g., the elderly, young children, etc.), may be exposed without adverse health effects during a lifetime or part of a lifetime, incorporating an adequate margin of safety. The potential for non-cancer health effects associated with oral and dermal exposures is evaluated by comparing an estimated chemical intake or DAD over a specified time period with an RfD derived for a similar exposure period. The RfD is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. Therefore, the ratio of the intake or DAD to the RfD, termed the hazard quotient (HQ), assumes there is a level of exposure (i.e., the RfD) below which it is unlikely for even sensitive subpopulations to experience adverse health effects.

The potential for non-cancer health effects associated with inhalation exposures is evaluated by comparing COPC concentrations in air (i.e., ECs) to RfCs derived for a similar exposure period (USEPA, 2009a). The HQ was estimated by calculating the ratio of the EC to the RfC.

The USEPA has indicated that RfDs and RfCs are based on the assumption that thresholds exist for certain toxic effects and that they often have an uncertainty spanning perhaps an order of magnitude. Chronic RfDs and RfCs were specifically developed to be protective of long-term exposure to a chemical. For construction/utility workers, whose exposure is assumed to occur over a one-year period, subchronic RfDs and RfCs were used, where available. For some chemicals, subchronic RfDs and RfCs were estimated from chronic RfDs and RfCs available in IRIS by removing the uncertainty factor applied where a chronic RfD or RfC was extrapolated from a subchronic study. Chronic RfDs and RfCs were used as conservative approximations where subchronic values were not available or could not be estimated.

The RfDs and RfCs for the characterization of potential chronic and subchronic non-cancer health effects via oral and inhalation exposures are presented in RAGS Part D Table 5.1 and Table 5.2 (see Appendix A), respectively, along with the primary target

organ, the combined uncertainty and modifying factors used in the derivation of the RfD and RfC, and the source of the RfD and RfC. Generally, order-of-magnitude (i.e., in increments of 10) uncertainty factors reflect the various types of toxicological data (e.g., a laboratory animal study extrapolated to the human condition) used to estimate the RfDs and RfCs. Modifying factors, which can range from greater than zero to 10, reflect qualitative professional judgment regarding scientific uncertainties (e.g., the completeness of the overall database) not covered by the uncertainty factor. Application of the uncertainty and modifying factors is intended to result in RfDs and RfCs that are protective of human health.

RfDs are not available to evaluate dermal exposure. In their absence, oral RfDs were used and adjusted following USEPA (2004) guidance to reflect absorbed dose. This allows for comparison between exposures estimated as absorbed doses and toxicity values expressed as absorbed doses. The oral-to-dermal adjustment factors and the adjusted RfDs are presented in RAGS Part D Table 5.1.

4.2. Carcinogenic Effects from Lifetime Exposure to COPCs

Regardless of the mechanism of effect, risk evaluation methods employed by the USEPA generally derive from the hypothesis that thresholds for cancer induction by carcinogens do not exist and that the dose-response relationship is linear at low doses. Based on this hypothesis, the USEPA has derived estimates of incremental cancer risk from lifetime exposure to potential carcinogens. This is accomplished by establishing the carcinogenic potency of the chemical through critical evaluation of the various test data and fitting dose-response data to a low-dose extrapolation model. The slope factor, which describes the dose-response relationship at low doses, is expressed as a function of intake [i.e., $(\text{mg/kg-day})^{-1}$].

Incremental lifetime cancer risks from oral and dermal exposures are estimated by multiplying an estimated daily intake or DAD prorated over 70 years by the slope factor. The resulting risk estimate is expressed as a unitless probability (e.g., 2×10^{-5} or 2 in 100,000) of an individual developing cancer. The unitless probability represents the incremental (or increased) lifetime cancer risk associated with the estimated exposure above the background risk of developing cancer. This linear equation is valid only at low risk levels (i.e., below estimated risks of 0.01). According to the USEPA, this approach does not necessarily give a realistic prediction of risk. The true value of the risk at trace ambient concentrations is unknown, and may be as low as zero.

To evaluate inhalation exposures, inhalation unit risk factors that relate cancer potency to a chemical concentration in air were used instead of slope factors (USEPA, 2009a). Incremental lifetime cancer risks from inhalation exposure were estimated by multiplying the EC by the unit risk factor.

The oral and inhalation slope factors and unit risk factors for the carcinogenic COPCs are presented in RAGS Part D Table 6.1 and Table 6.2 (see Appendix A), respectively. These toxicity values were used to estimate finite, upper limits of risk at low dose levels administered over a lifetime. For children, the estimated cancer risk reflects the potential risk over a lifetime due to childhood exposure. The USEPA weight-of-evidence classification under the USEPA's 1986 guidelines for carcinogen risk assessment (USEPA, 1986) or cancer guideline description under USEPA's revised carcinogen risk assessment guidelines (USEPA, 2005b, 1999, 1996a) for carcinogenicity and the source of slope factors or unit risk factors are also presented in RAGS Part D Tables 6.1 and 6.2.

Seven of the polycyclic aromatic hydrocarbons (PAH) [i.e., benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] are considered probable human carcinogens of varying potency. With the exception of chrysene, all of these PAHs were identified as COPCs in one or more groundwater data sets. Potency factors relative to the carcinogenicity of benzo(a)pyrene, the most studied and most potent of the carcinogenic PAHs, have been developed (USEPA, 1993) and were used to derive the cancer slope factors for the other carcinogenic PAHs.

The USEPA indicates that early-life exposure to carcinogenic chemicals with a mutagenic mode of action can result in a greater contribution to cancers appearing later in life (USEPA, 2005a). To account for this, ADAFs were applied to the oral slope factors and unit risk factors for carcinogenic COPCs with a mutagenic mode of action. The USEPA (2005a) recommends a ten-fold adjustment for exposure during 0 and 2 years of age, a three-fold adjustment for exposures between 2 and 16 years of age, and no adjustment for exposures after turning 16 years of age.

The COPCs in this BHHRA for which ADAFs were applied are chromium VI, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (USEPA, 2011c). To facilitate the application of ADAFs, intakes and dermally absorbed doses were calculated for each of the following age groups: 0-2 and 2-6 for the resident child; 0-2, 2-6, 6-16, and 16-30 for the resident adult. For the current/future resident child, an ADAF of 10 was applied to the cancer toxicity values to evaluate exposure from the ages 0 to 2, and an ADAF of 3 was

applied to evaluate exposure from the ages of 2 to 6. For the current/future resident adult, an additional ADAF of 3 was applied to evaluate exposure from the ages of 6 to 16. No adjustment was made to evaluate exposure from the ages of 16 to 30.

As with RfDs, the USEPA has not derived slope factors to evaluate dermal exposure. In their absence, slope factors for oral exposure were used and adjusted per USEPA guidance to reflect absorbed dose. This allows for risk estimation based on exposures estimated as absorbed doses and slope factors expressed as absorbed doses. The oral-to-dermal adjustment factors and the adjusted slope factors are presented in RAGS Part D Table 6.1.

4.3. Noncarcinogenic Effects from Chronic Exposure to Lead

The USEPA has not developed standard estimates representing a dose-response assessment for lead, because a clear threshold for some of the more sensitive effects in humans from exposure to lead has not been identified (ATSDR, 2007). Rather, exposure to lead is typically evaluated in terms of the increase in blood lead (PbB) concentrations following exposure. The United States Department of Health and Human Services' Centers for Disease Control and Prevention and the ATSDR have designated, and the USEPA has adopted, 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) as a PbB concentration of concern to protect sensitive populations (e.g., neonates, infants, and children). The USEPA's stated goal for lead is that children have no more than a 5 percent probability of exceeding a PbB concentration of 10 $\mu\text{g}/\text{dL}$ (USEPA, 2009d).¹² As such, this level is assumed to also provide protection for adults.

For resident children exposed to lead, the evaluation is facilitated through the use of the USEPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children (USEPA, 2002a, 1994), accessed at:

www.epa.gov/superfund/programs/lead/products.htm. The IEUBK model uses detailed multi-compartment biokinetic modeling. Relationships are defined within the IEUBK model between external sources of lead exposure from various media (e.g., soil, dust, air, water, diet) and internal compartments, such as plasma or extra-cellular fluid, red blood cells, other soft tissue, trabecular (spongy) bone, and cortical (compact) bone. In the uptake portion of the model, lead uptake through the lung and gastrointestinal tract are

¹² Recent evidence suggests that adverse health effects may occur at PbB concentrations of 5 $\mu\text{g}/\text{dL}$ or lower (USEPA, 2009b). However, the USEPA Office of Superfund Remediation and Technology Innovation has not yet developed new lead policy to address this recent evidence.

estimated based on absorption coefficients (i.e., percent of lead absorbed). The biokinetic portion of the model estimates transfer between internal body compartments using transfer coefficients. This biokinetic transfer is conducted for multiple time steps. Default lung and gastrointestinal tract absorption factors were used. The biokinetic transfer coefficients and number of time steps are model-defined.

A model for quantitatively evaluating the potential for adverse health effects from adult exposure to lead in groundwater is currently not available. Rather, a qualitative discussion of the potential for adverse health effects in adult workers was included in the Risk Characterization.

4.4. Chemical Mixtures

USEPA guidance was also used to evaluate the overall potential for non-cancer health effects and cancer risks from exposure to multiple chemicals. For the evaluation of non-cancer health effects, USEPA guidance assumes that sub-threshold exposures to several chemicals at the same time could result in an adverse health effect. The sum of the HQs (for individual chemicals, exposure routes, exposure pathways, or potentially-exposed populations) is termed the hazard index (HI). Generally, hazard indices are only used in the evaluation of a mixture of chemicals that induce the same effect by the same mechanism of action. In this BHHRA, the hazard indices of a mixture of chemicals that can have different effects were used as a screening-level approach, as recommended by the USEPA (1989). This approach may overestimate the likelihood of adverse, non-cancer health effects. Therefore, for hazard indices that were greater than 1, toxic endpoint-specific hazard indices were calculated based on the toxicological endpoint (e.g., liver effects) used to derive the RfD.

For the evaluation of cancer risks, USEPA guidance indicates that the individual risks associated with exposure to each chemical can be summed. This approach was used in this BHHRA and assumes independence of action by the chemicals involved (i.e., that there are no synergistic or antagonistic chemical interactions and that all chemicals produce the same effect: cancer).

4.5. COPCs without Toxicity Values

Toxicity values (i.e., RfDs, RfCs, cancer slope factors, and unit risk factors) were not available to quantitatively assess the potential for human health risks for the following COPCs: benzo(g,h,i)perylene, phenanthrene, delta-BHC, endosulfan sulfate, endrin

aldehyde. Possible health implications that may be associated with exposure to these chemicals are described in the Risk Characterization.

5. Risk Characterization

Risk characterization involves combining exposure estimates with toxicity information to generate incremental lifetime cancer risks and non-cancer hazards for each human exposure scenario evaluated in the BHHRA. In this section, the cancer risks and non-cancer hazards are presented and discussed. The potential for adverse, non-cancer health effects from exposure to lead in potable groundwater is also discussed with respect to the results of the IEUBK model. Lastly, sources of uncertainty in this BHHRA are documented and discussed.

5.1. Cancer Risks and Non-cancer Hazards

As described in Section 4.2, individual cancer risks are expressed as unitless probabilities (e.g., $2\text{E-}05$ or 2 in 100,000) of a person developing cancer. The total individual (i.e., COPC-specific) cancer risks are summed for each exposure pathway and scenario to arrive at an estimate of the potential for cancer risk from cumulative exposure. For known or suspected carcinogens, the NCP established that acceptable exposure levels are generally concentration levels that represent an incremental upper-bound lifetime cancer risk in the range from 10^{-4} (i.e., $1\text{E-}04$ or 1 in 10,000) to 10^{-6} (i.e., $1\text{E-}06$ or 1 in 1,000,000) or less (USEPA, 1990). The cancer risks estimated for each exposure scenario were therefore compared to this risk range established by the NCP.

As described in Section 4.1, the potential for non-cancer health effects associated with chemical exposure was evaluated by calculating the ratio of an estimated intake or EC over a specified time period with a chemical-specific RfD or RfC derived for a similar exposure period. The RfD or RfC is an estimate of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime. The non-cancer HQ therefore assumes there is a level of exposure below which it is unlikely for even sensitive subpopulations to experience adverse health effects. The total individual HQs were summed for each exposure pathway and scenario to yield HIs representative of the potential for adverse, non-cancer health effects from cumulative exposure. For the non-cancer assessment, exposure scenarios with an HI greater than $1\text{E}+00$ are of potential concern.

The COPC and exposure route-specific incremental lifetime cancer risks and non-cancer HQs associated with potential exposure to the receptors evaluated in this BHHRA are

presented in RAGS Part D Tables 7.1.RME to 7.6.RME. The total incremental lifetime cancer risks and total non-cancer HI for the COPCs summed for all exposure routes are presented in RAGS Part D Tables 9.1.RME to 9.6.RME. Where the total cancer risk or total HI is greater than, respectively, the risk range established by the NCP or a target HI of $1\text{E}+00$, the COPCs that are the predominant contributors to the risk or hazard estimates are presented in the corresponding RAGS Part D Table 10. Where a total non-cancer HI is greater than $1\text{E}+00$, toxic endpoint-specific HIs were calculated and presented in the corresponding RAGS Part D Table 9. If a COPC had more than one toxic endpoint (e.g., liver effects and kidney effects), the total HI was accounted for in each toxic endpoint category that applies to the COPC.

The cancer risks and non-cancer HIs are summarized in Table 7-1 for the RME scenario and Table 7-2 for the CTE scenario. The cancer risks and non-cancer HIs are presented and discussed by receptor population in the following sections.

5.1.1. Current/Future Commercial/Industrial Worker

RAGS Part D Table 7.1.RME presents the calculation of incremental lifetime cancer risks and non-cancer hazards for each of the exposure pathways and routes evaluated for the commercial/industrial worker. As shown, the total cancer risk is $8\text{E}-03$, which is greater than the risk range established by the NCP. The HI is $1\text{E}+02$, which is greater than the target HI of $1\text{E}+00$.

Based on the RME assumptions used in this BHHRA, cancer risks greater than the risk range established by the NCP were estimated for both the dermal contact ($5\text{E}-03$) and inhalation exposure routes ($3\text{E}-03$). As shown in RAGS Part D Table 10.1.RME, the predominant contributors to these cancer risks are trichloroethene (TCE) (34%), 4,4'-DDT (30%), and 4,4'-DDD (17%). Use of CTE parameters yielded a total cancer risk of $2\text{E}-03$ (RAGS Part D Table 10.1.CTE).

The potential for non-cancer hazard was also indicated for both exposure routes evaluated: dermal contact ($1\text{E}+02$) and inhalation ($2\text{E}+01$). The highest non-cancer HIs presented in RAGS Part D Table 10.1.RME were estimated for total PCB Aroclors (44%) and 4,4'-DDT (29%). Use of CTE parameters yielded a non-cancer HI of $1\text{E}+02$ (RAGS Part D Table 10.1.CTE), which is the same as the RME scenario.

5.1.2. Current/Future Construction/Utility Worker

RAGS Part D Table 7.2.RME to Table 7.4.RME present the calculation of incremental lifetime cancer risks and non-cancer hazards for each of the exposure units, exposure pathways and routes evaluated for the construction/utility worker.

For the shallow onsite groundwater exposure unit (RAGS Part D Table 7.2.RME), the total cancer risk is $5\text{E-}05$, which is within the risk range established by the NCP. The non-cancer HI is $7\text{E}+01$, which is greater than the target HI of $1\text{E}+00$. As shown in RAGS Part D Table 10.2.RME, the non-cancer hazard is predominantly due to total PCB Aroclors (75%) and cis-1,2-dichloroethene (23%). Use of CTE parameters yielded a total cancer risk of $1\text{E-}05$ (RAGS Part D Table 7.2.CTE), which is within the risk range established by the NCP. The non-cancer HI under the CTE scenario is $6\text{E}+01$, which is still greater than the target HI of $1\text{E}+00$.

For the shallow offsite groundwater, south of Bound Brook exposure unit (RAGS Part D Table 7.3.RME), the total cancer risk is $3\text{E-}05$, which is within the risk range established by the NCP. The non-cancer HI is $2\text{E}+01$, which is greater than the target HI of $1\text{E}+00$. As shown in RAGS Part D Table 10.3.RME, the non-cancer hazard is from exposure to total PCB Aroclors. Use of CTE parameters yielded a total cancer risk of $8\text{E-}06$ and a non-cancer HI of $2\text{E}+01$, as shown in RAGS Part D Table 7.3.CTE.

For the shallow offsite groundwater, north of Bound Brook exposure unit (RAGS Part D Table 7.4.RME), the total cancer risk is $8\text{E-}07$, which is less than the risk range established by the NCP. The non-cancer HI is $3\text{E}+00$, which is greater than the target HI of $1\text{E}+00$. As shown in RAGS Part D Table 10.4.RME, the non-cancer hazard is from exposure to total PCB Aroclors. Use of CTE parameters yielded a total cancer risk of $2\text{E-}07$ and a non-cancer HI of $3\text{E}+00$, as shown in RAGS Part D Table 7.4.CTE.

5.1.3. Current/Future Resident Adult

RAGS Part D Table 7.5.RME presents the calculation of incremental lifetime cancer risks and non-cancer hazards for each of the exposure pathways and routes evaluated for the resident adult. As shown, the total cancer risk is $2\text{E-}02$, which is greater than the risk range established by the NCP. The HI is $4\text{E}+02$, which is greater than the target HI of $1\text{E}+00$.

Based on the RME assumptions used in this BHHRA, cancer risks greater than the risk range established by the NCP were estimated for all of the exposure routes evaluated: ingestion ($6\text{E-}03$), dermal contact ($1\text{E-}02$), and inhalation ($1\text{E-}03$). As shown in RAGS

Part D Table 10.5.RME, the predominant contributors to these cancer risks are 4,4'-DDT (30%), 4,4'-DDD (19%), TCE (10%), and arsenic (10%). Use of CTE parameters yielded a total cancer risk of $2\text{E}-03$ (RAGS Part D Table 10.5.CTE).

The potential for non-cancer hazard was also indicated for all of the exposure routes evaluated under the RME scenario: ingestion ($2\text{E}+02$), dermal contact ($1\text{E}+02$), and inhalation ($4\text{E}+00$). The highest non-cancer HIs presented in RAGS Part D Table 10.5.RME were estimated for cis-1,2-dichloroethene (55%), total PCB Aroclors (23%), 4,4'-DDT (16%). Use of CTE parameters yielded a non-cancer HI of $2\text{E}+02$ (RAGS Part D Table 10.5.CTE).

5.1.4. Current/Future Resident Child

RAGS Part D Table 7.6.RME presents the calculation of incremental lifetime cancer risks and non-cancer hazards for each of the exposure pathways and routes evaluated for the resident child. As shown, the total cancer risk is $7\text{E}-03$, which is greater than the risk range established by the NCP. The HI is $8\text{E}+02$, which is greater than the target HI of $1\text{E}+00$.

Cancer risks greater than the risk range established by the NCP were estimated for all of the exposure routes evaluated: ingestion ($2\text{E}-03$), dermal contact ($4\text{E}-03$), and inhalation ($5\text{E}-04$). As shown in RAGS Part D Table 10.6.RME, the predominant contributors to these cancer risks are 4,4'-DDT (28%), 4,4'-DDD (18%), TCE (11%), and arsenic (10%). Use of CTE parameters yielded a total cancer risk of $3\text{E}-03$ (RAGS Part D Table 10.6.CTE).

The potential for non-cancer hazard was also indicated for all of the exposure routes evaluated: ingestion ($5\text{E}+02$), dermal contact ($3\text{E}+02$), and inhalation ($1\text{E}+01$). The highest non-cancer HIs presented in RAGS Part D Table 10.6.RME were estimated for cis-1,2-dichloroethene (55%), total PCB Aroclors (23%), and 4,4'-DDT (15%). Use of CTE parameters yielded a non-cancer HI of $4\text{E}+02$ (RAGS Part D Table 10.6.CTE).

5.2. Discussion of Cancer Risks and Non-cancer Hazards

As summarized in Table 7-1 and Table 7-2, the greatest cancer risks were estimated for the commercial/industrial worker, resident adult, and resident child exposed to chemicals in the entire aquifer. The cancer risks estimated for the construction/utility worker were less than the risk range established by the NCP for all three shallow groundwater exposure units. However, the potential for adverse, non-cancer health effects was

indicated for all of the potential receptor populations and exposure units evaluated in this BHHRA, under both the RME and CTE scenarios.

Further evaluation of the entire aquifer data set reveals relatively elevated COPC concentrations in a few wells located within the former CDE facility boundary. This observation was also noted in Section 2.3, which described the groundwater exposure units established for this BHHRA, and Section 3.3.1, which discussed the derivation of EPCs for the COPCs in each data set. The presence of relatively elevated COPC concentrations in just a few wells biases the calculated EPCs high, such that the cancer risks and non-cancer hazards estimated using the entire aquifer data set do not reflect the potential for adverse health effects from exposure to groundwater across the entire Site. Therefore, this section presents an alternate evaluation that excludes data from the onsite monitoring wells in which relatively elevated chemical concentrations were observed. The intention is to show whether any risk reduction might be achieved by preventing human exposure to concentrations detected in these few onsite monitoring wells.

The alternate evaluation focuses on the COPCs that were listed in Table 10.1RME, Table 10.5RME, and Table 10.6RME. These COPCs are the largest contributors to the cancer risks and non-cancer hazards estimated using the entire aquifer data set. As shown in RAGS Part D Table 2.1, the maximum detected concentrations of all of these COPCs (except for arsenic) were observed in MW-06, MW-11, MW-12, and MW-14S-04.¹³ Appendix F, Table F-1 presents the MW-06, MW-11, MW-12, and MW-14S (sampler ports 1 through 4) sample results for each COPC. These concentrations (or reporting limits for non-detect results) were excluded from the entire aquifer data set, and alternate EPCs for each COPC were derived using ProUCL. Where applicable, Table F-1 also shows the total PCB Aroclor and 2,3,7,8-TCDD TEQ concentrations that were already excluded from the baseline evaluation because they indicated the presence of NAPL. As presented in Section 3.3.1, these concentrations were also detected in MW-11, MW-12, and MW-14S-04.

Table F-2 presents the alternate EPCs compared to those used in the baseline evaluation. As shown, EPCs for many of the COPCs were reduced by at least one order of magnitude. The EPC for 2,3,7,8-TCDD TEQ was not revised, as there were no additional sample results to exclude. The EPCs for dibenzo(a,h)anthracene and arsenic are effectively the same.

¹³ The maximum detected concentration of arsenic was detected in FPW-01.

Table F-3 presents the alternate cancer risks and non-cancer hazards estimated by replacing the EPCs for just these select COPCs in the RAGS Part D Table 7RMEs for the commercial/industrial worker, resident adult, and resident child. As shown, some risk reduction is afforded by removing groundwater data from the select onsite wells with relatively elevated concentrations. However, the total cancer risks and non-cancer hazards estimated for these receptors under the RME scenarios are still greater than, respectively, the risk range established by the NCP and the target non-cancer HI of 1E+00. This indicates that the potential for unacceptable cancer risks and non-cancer hazards cannot be explained by relatively elevated concentrations in a few onsite monitoring wells alone.

In addition, even after excluding the concentrations noted above from the entire aquifer data set, a variety of COPCs have one or more elevated concentrations compared to federal or NJDEP MCLs: 13 VOCs, three SVOCs, five pesticides, PCB Aroclors, and eight metals.

5.3. Lead

The potential for adverse health effects from exposure to lead is evaluated through comparison of predicted PbB concentrations to a health-protective target PbB concentration. As stated in Section 4.3, the USEPA's stated goal for lead is that children have no more than a 5 percent probability of exceeding a PbB concentration of 10 µg/dL (USEPA, 2009d). As such, this concentration is assumed to also provide protection for adults.

The USEPA's IEUBK model was used to evaluate the potential for exposure of resident children to lead in groundwater used as a source of potable water. The focus of the IEUBK model is the prediction of PbB concentrations in young children exposed to lead from several sources and by ingestion and inhalation exposure routes. The model uses four interrelated modules (exposure, uptake, biokinetic, and probability distribution) to mathematically and statistically link environmental lead exposure to PbB concentrations for a population of young children (birth to 84 months of age). A plausible distribution of PbB concentrations, centered on a geometric mean PbB concentration, is predicted and used to estimate the probability that a child's or a population of children's PbB concentrations will exceed the target PbB concentration. The IEUBK model is intended for a residential exposure scenario, as it considers inhalation and ingestion exposures to indoor air and dust that result from tracking soil into the home, as well as dietary and drinking water exposures.

Children ages birth to 7 years old were modeled. Consistent with USEPA guidance, the arithmetic mean lead concentration in the entire aquifer data set was used as the EPC for lead in groundwater. IEUBK model defaults for lead in outdoor and indoor air, lead in the diet, lead in soil, and maternal lead concentration were used. The multiple source analysis option was selected to model an average household indoor dust concentration. Information on all parameters is presented in the RAGS D IEUBK Lead Worksheet provided in Appendix E.

Predicted lead uptakes and PbB concentration for each age interval are shown in the model output, also in Appendix E. A plausible distribution of PbB concentrations, centered on a geometric mean PbB concentration, was predicted and used to estimate the probability that a child's or a population of children's PbB concentrations will exceed the target PbB concentration. This probability density distribution is shown with the model output. Based on the IEUBK model, the estimated geometric mean PbB concentration is 2.6 µg/dL, and the probability that the PbB concentration is greater than 10 µg/dL is 0.22 percent. Therefore, lead concentrations in groundwater should not pose a risk to resident children. By extension, lead concentrations in groundwater also should not pose a risk to resident adults.

5.4. Qualitative Assessment of Groundwater Vapor Migration to Outdoor Ambient Air Pathway

As established in RAGS Part D Table 1, uncertainties associated with quantitatively modeling ambient air concentrations following volatilization from groundwater that may include DNAPL in fractured bedrock precludes the calculation of cancer risks and non-cancer hazards from exposure to estimated concentrations of volatile chemicals in outdoor air. Rather, a qualitative evaluation of the pathway by which volatile chemicals migrate through the bedrock and overburden to outdoor ambient air is presented herein. The focus of the evaluation is on the potential for migrating vapors to attenuate or decrease to concentrations in outdoor air that do not pose a human health risk.

Table 7-3 presents the volatile chemicals and their maximum concentrations detected in each of the shallow groundwater exposure units established for this BHHRA. The source vapor concentration corresponding to each maximum chemical concentration was calculated using the following equation, assuming the vapor and aqueous-phase concentrations are in local equilibrium according to Henry's law (USEPA, 2003b):

$$C_{v,s} = C_{gw} \times H' \times CF$$

Where:

$C_{v,s}$ = source vapor concentration ($\mu\text{g}/\text{m}^3$)
 C_{gw} = maximum groundwater concentration ($\mu\text{g}/\text{L}$)
 H' = Henry's Law constant (unitless)
 CF = conversion factor, $1\text{E}+03 \text{ L}/\text{m}^3$

Source vapor concentrations were then compared to the USEPA RSLs for Resident Air (USEPA, 2011a), which are based on either a target cancer risk of $1\text{E}-06$ or a non-cancer HQ of 1, and a hypothetical attenuation factor was calculated as the ratio between the RSL and source vapor concentration. The hypothetical attenuation factor (e.g., $6\text{E}-05$ for benzene in shallow onsite groundwater) represents the attenuation or dilution that would have to occur for the source vapor concentration to decrease to a concentration in outdoor air that does not pose a human health risk. In this scenario, such attenuation/dilution could occur during vapor diffusion through the subsurface or by mixing with outdoor ambient air.

As shown, the hypothetical attenuation factors for volatile chemicals detected in shallow onsite groundwater range from $2\text{E}-01$ for m,p-xylene to $2\text{E}-08$ for TCE. This implies a 200 million-fold dilution would have to occur for source vapor concentrations corresponding to the maximum detected TCE concentration in shallow onsite groundwater to decrease to the USEPA RSL for Resident Air. For some chemicals (e.g., acetone), no dilution would be needed, as the source vapor concentrations are less than the corresponding RSLs. The hypothetical attenuation factors for volatile chemicals in shallow offsite groundwater, south of Bound Brook range from $2\text{E}-02$ for naphthalene to $2\text{E}-06$ for TCE. For shallow offsite groundwater, north of Bound Brook, the hypothetical attenuation factors range from $7\text{E}-01$ for toluene to $9\text{E}-06$ for TCE.

The actual amount of attenuation that occurs as vapors migrate through the subsurface depends on the vertical distance from the groundwater source to the point of exposure, the nature and geometry of the subsurface materials, the presence/absence of preferential pathways, and the mobility and persistence of the chemical. The shallow groundwater data presented in this BHHRA represent samples from screened intervals as shallow as 17 feet bgs and as deep as 75 feet bgs (see Table 2-4). The maximum TCE concentrations in shallow groundwater were detected in samples from screened intervals less than 50 feet bgs. The USEPA (2003b) established 100 feet as a conservative measure of the vertical distance through which vapors might be expected to attenuate to "negligible" concentrations. However, due to the highly fractured and weathered nature of the shallow bedrock units, it is impossible to know what vertical distance would apply. It is instead

expected that, should vapors migrate from the shallow groundwater through the bedrock and overburden to outdoor ambient air, mixing with ambient air would bring about the greatest decrease in vapor concentrations. In addition, for the portions of the Site that are developed with pavement or buildings, the groundwater to outdoor air exposure pathway is essentially incomplete.

5.5. Qualitative Assessment of COPCs without Toxicity Values

For some chemicals, toxicity studies are insufficient to determine RfDs/RfCs or slope factors/unit risk factors for oral and/or inhalation exposure. As a result, the cancer risks and non-cancer HIs may be underestimated. Toxicity values were not available for the following COPCs: benzo(g,h,i)perylene, phenanthrene, delta-BHC, endosulfan sulfate, and endrin aldehyde. While cancer risks and non-cancer hazards were not quantified, possible health implications that may be associated with exposure to these chemicals can be found in ATSDR Toxicological Profiles (as available) obtained through the following website: <http://www.atsdr.cdc.gov/toxpro2.html>.

- Benzo(g,h,i)perylene and phenanthrene.¹⁴ These two chemicals are among the 17 PAHs typically analyzed for and evaluated at hazardous waste sites. The 17 PAHs often occur together in the environment and many have similar environmental fate and toxicological characteristics (ATSDR, 1995). However, reliable environmental fate and toxicological information exists for only a few of the 17 PAHs and the potential health effects of the other less well-studied PAHs must be inferred from this information (ATSDR, 1995). The USEPA (2011b) weight-of-evidence characterization for both chemicals is “D - not classifiable as to carcinogenicity” based on no human data and inadequate animal data.
- delta-BHC.¹⁵ delta-BHC is one of eight isomers of the insecticide hexachlorocyclohexane (also called benzene hexachloride). While the toxicity of the isomers varies, all of them can produce liver and kidney effects (ATSDR, 2005). The USEPA (2011b) regards it as a possible human carcinogen based on increases in benign liver tumors in mice fed beta-HCH.
- Endosulfan sulfate.¹⁶ Endosulfan sulfate is a reaction product found in technical endosulfan, a man-made insecticide, as a result of oxidation in nature,

¹⁴ An ATSDR Toxicological Profile for PAHs is available from August 1995.

¹⁵ An ATSDR Toxicological Profile for hexachlorocyclohexane is available from August 2005.

¹⁶ An ATSDR Toxicological Profile for endosulfan is available from September 2000.

biotransformation, or photolysis. The only studies of longer term exposure to low concentrations of endosulfan are in animals. These animal studies indicate the kidneys, testes, and possibly the liver were affected (ATSDR, 2000). Endosulfan has not been classified by the USEPA with regard to its ability to cause cancer. The limited animal studies have not shown evidence of carcinogenicity. However, some of the animal studies have shown endosulfan can cause damage to genetic material within cells (ATSDR, 2000).

- Endrin aldehyde.¹⁷ Endrin aldehyde is an impurity and breakdown product of endrin, which was used as a pesticide. There are no known adverse health effects based on long-term exposure to workers who have been exposed to endrin. Animal studies indicate the nervous system is likely the main toxic endpoint (ATSDR, 1996). The USEPA (2011b) classifies endrin as “D - not classifiable as to human carcinogenicity” based on animal studies in rats and mice.

5.6. Uncertainty Evaluation

Risk assessment involves the integration of complex analyses of chemical concentrations in the environment, the fate and transport of chemicals in the environment, the potential for human exposure, and the chemical potency and/or toxicity. Some uncertainties are associated with each component in this process. Uncertainty in an HHRA is typically accounted for by identifying the sources of uncertainty and characterizing whether the risk estimates may be over-predicted or under-predicted. Within this section, the sources of uncertainty in this BHHRA are briefly discussed.

5.6.1. Data Evaluation

Sampling and analysis and data selection contribute to uncertainty in the baseline cancer risks and non-cancer hazards. Uncertainty associated with environmental sampling is generally related to limitations of the sampling in terms of the number and distribution of samples, while uncertainty associated with the analysis of samples is generally associated with systematic or random errors (i.e., false positive or negative results). The cancer risks and non-cancer hazards estimated in this BHHRA are based on an extensive groundwater data set, which characterizes the entire aquifer, both horizontally and vertically, and accounts for seasonal variation. Sampling procedures detailed in the approved *Final Remedial Investigation/Feasibility Study Work Plan* (Malcolm Pirnie, 2008b) were followed to reduce the uncertainty associated with groundwater sample collection.

¹⁷ An ATSDR Toxicological Profile for endrin is available from August 1996.

Independent validation of the laboratory data was performed by USEPA Region 2 to reduce uncertainty associated with the sample analyses. As stated in Section 2.1, the majority of the groundwater data is of acceptable quality overall but subject to the data validator's qualifying remarks. As demonstrated in Table 2-3, sample reporting limits for some non-detect chemicals were greater than the USEPA RSLs used to select COPCs. Thus, the potential for exposure and adverse health effects may be overestimated or underestimated depending on how well groundwater was characterized.

As stated in Section 2, the individual wells/ports selected for PCB congener and dioxin/furan analyses was based on the detected concentrations of PCB Aroclors in groundwater samples from October 2009. Because this sampling approach is biased toward wells that are most likely to contain contaminants due to historical activities at the former CDE facility, the potential for adverse health effects from exposure to 2,3,7,8-TCDD TEQ in groundwater across the Site was likely overestimated.

In addition, the potential for adverse health effects from exposure to chromium was likely overestimated, because total chromium concentrations in groundwater were evaluated using toxicity values specific to hexavalent chromium, which is the most toxic form of chromium.

5.6.2. Fate and Transport Modeling

This BHHRA relies on certain assumptions regarding the fate and transport of chemicals in groundwater and the potential for vapor migration from groundwater to indoor and outdoor air. EPCs for the volatile COPCs in indoor air (e.g., bathroom or building air) were estimated using screening-level emission/release calculations and atmospheric dispersion modeling. Due to their relative simplicity, these calculations and models tend to overestimate these processes. For example, source depletion over time (e.g., through COPC release or environmental degradation) was not accounted for. Uncertainty associated with such modeling is related to the accuracy with which environmental conditions and processes are simulated. Overall, the inhalation exposure scenarios were modeled in ways that likely overestimate the potential for exposure and adverse health effects.

Evaluation of the entire aquifer exposure unit assumes that groundwater in all of the wells, across all sampled depths, is in communication, and that derivation of an EPC using all of the groundwater data (with the exception of ERT-8) approximates the true average concentration of a COPC in groundwater across the Site. Depending on how well this conceptual understanding of groundwater flow approximates reality, the potential for

exposure and adverse health effects may have been under- or overestimated to an unknown degree.

The RI Report established that aqueous mass from the former CDE facility has been interpreted to not extend to ERT-5 and ERT-6 in the intermediate zone, and MW-18 in the deep zone. Therefore, data from these wells were excluded from the delineated aqueous mass in Figures 5-12 and 5-13 of the RI Report. Because of the uncertainty associated with modeling groundwater flow through fractured bedrock, data from these wells were nonetheless included in the “entire aquifer” and “shallow offsite groundwater, south of Bound Brook” data sets evaluated in this BHHRA. To determine the relative contribution that groundwater data from these wells make to the baseline cancer risks and non-cancer hazards estimated in this BHHRA, the following presents an evaluation of groundwater data from only ERT-5, ERT-6 and MW-18.

Appendix G, Table G-1 presents the analytical data from groundwater samples collected from these three wells in October 2009 and March/April 2010. The sample results are limited to the chemicals that were identified as COPCs in the entire aquifer (See RAGS Part D Table 2.1) or shallow offsite groundwater, south of Bound Brook (See RAGS Part D Table 2.3) data sets and that were also detected in any of the three wells. A data summary, including the frequency of detection and range of detected concentrations, is presented for each COPC. Table G-1 also presents EPCs calculated for each COPC, using only the data from ERT-5, ERT-6 and MW-18 samples. These EPCs were used in the same intake/exposure calculations presented in RAGS Part D Table 7.1RME, Table 7.5RME, and Table 7.6RME and cancer risks and non-cancer hazards were estimated for, respectively, the commercial/industrial worker, resident adult, and resident child.

Table G-2 presents the cancer risks and non-cancer hazards estimated for each receptor. As shown, the cancer risks range from 5E-04 for the commercial/industrial worker to 1E-03 for the resident adult and resident child. These cancer risks are all greater than the risk range established by the NCP. The non-cancer hazards range from 1E+00 for the commercial/industrial worker to 1E+01 for the resident child. The HIs for the resident adult (5E+00) and resident child are greater than the target HI of 1E+00. Table G-2 also notes the COPCs that are the predominant contributors to these cancer risks and non-cancer hazards. The greatest contributors to the cancer risks estimated using data from ERT-5, ERT-6 and MW-18 only were dibenzo(a,h)anthracene and arsenic. The only COPCs that indicated a potential for non-cancer hazard were total PCB Aroclors and arsenic. Based on this evaluation, a portion of the potential for cancer risk and non-cancer hazard indicated in the baseline evaluation is attributable to concentrations of

dibenzo(a,h)anthracene, total PCB Aroclors, and arsenic detected in ERT-5, ERT-6, and MW-18.

5.6.3. Human Exposure Modeling

The exposure assessment relies on a series of assumptions regarding the potential for human exposure, outlined in the CSM and approximated in the daily intake calculation by parameters such as the groundwater EPC and receptor-specific exposure duration, frequency, and time. This BHHRA attempted to address some of the uncertainty in these assumptions by conservatively evaluating the potential for cancer risk and non-cancer hazard to individuals under RME conditions in the current/future and future exposure scenarios. The assessment primarily relied on the USEPA's standard default exposure assumptions which are used at Superfund sites across the country with appropriate modifications to reflect site-specific conditions. The intention is to over-estimate the potential for risk and hazards, so that actual risks are less than those predicted in this BHHRA.

The number of non-detected chemicals in a data set and the treatment of non-detects in the statistical evaluation of the data (i.e., substitution of the full sample reporting limit) may result in uncertainty in the calculated EPCs for some COPCs. As a result, the EPCs may be underestimated or overestimated. The EPCs used in the exposure assessment (i.e., the 95% UCL on the arithmetic average concentration or the maximum detected concentration) were estimated without consideration of environmental migration, transformation, degradation, or loss and should result in overestimates of long-term exposure.

While aspects of the exposure assessment methodology can result in over-estimates or under-estimates of human exposure, exposure is probably overestimated, overall, for the potentially exposed populations evaluated.

5.6.4. Available Toxicity Values

The derivation of the toxicity values that form the basis of the risk characterization can result in overestimates or underestimates of the potential for adverse health effects. In most cases, the toxicity values are derived from extrapolation from laboratory animal data to humans. As indicated in RAGS Part D Tables 5.1 and 5.2, the oral RfDs and inhalation RfCs contain modifying and/or uncertainty factors that range from 1.5 to 3,000.

RfDs and cancer slope factors for oral exposure were adjusted and used to assess risks from dermal absorption. While this adjustment follows USEPA guidance, oral absorption for the organic COPCs was assumed to be 100 percent which may underestimate dermal contact exposure for some chemicals. For those chemicals with specific oral absorption factors, consideration was not given to the absorption efficiency of the exposure vehicle used in the studies on which the factors are based. This may overestimate or underestimate dermal contact risks for some chemicals.

For benzene, where the USEPA provides a range of cancer potency, the more conservative (i.e., health protective) oral and inhalation cancer slope factors were used.

Finally, for some chemicals, health criteria are insufficient to determine RfDs or slope factors for oral and/or inhalation exposure. As a result, the risk estimates may be underestimated. Toxicity values (i.e., RfDs, RfCs, cancer slope factors, and unit risk factors for assessing oral and inhalation exposure) were not available for the following COPCs: benzo(g,h,i)perylene, phenanthrene, delta-BHC, endosulfan sulfate, and endrin aldehyde. A brief summary of adverse health effects associated with exposure to each of these these chemicals was presented in Section 5.5.

At the present time, scientists with the USEPA's IRIS Program are evaluating the toxicity of some chemicals that were identified as COPCs in groundwater, including benzo(a)pyrene, naphthalene, and TCE (see IRIS Track at www.epa.gov/iris). This may result in modification to the toxicity values used in this BHHRA. Therefore, the toxicity values used herein may result in either an underestimate or overestimate of the cancer risks and non-cancer HIs.

6. Summary of Draft BHHRA

The incremental lifetime cancer risks estimated under the RME scenarios evaluated in this BHHRA range from $8\text{E-}07$ for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to $2\text{E-}02$ for resident adult exposure to the entire aquifer. The predominant contributors to the cancer risk estimated for the resident adult are 4,4'-DDT, 4,4'-DDD, trichloroethylene, and arsenic. The incremental lifetime cancer risks estimated using CTE assumptions range from $2\text{E-}07$ for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to $3\text{E-}03$ for resident child exposure to the entire aquifer. Under both the RME and CTE scenarios, the incremental lifetime cancer risks for commercial/industrial worker, resident adult, and resident child exposure to the entire aquifer are greater than the cancer risk range of 10^{-4} to 10^{-6} established by the NCP.

Non-cancer HIs estimated under the RME scenarios range from $3\text{E}+00$ for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to $8\text{E}+02$ for resident child exposure to the entire aquifer. The predominant contributors to the non-cancer hazard estimated for the resident child are cis-1,2-dichloroethene, total PCB Aroclors, and 4,4'-DDT. Non-cancer HIs estimated using CTE assumptions range from $3\text{E}+00$ for the construction/utility worker exposure to shallow offsite groundwater, north of Bound Brook to $4\text{E}+02$ for resident child exposure to the entire aquifer. Under both the RME and CTE scenarios, the non-cancer HIs are greater than $1\text{E}+00$ for all potential human receptors, indicating there is the potential for adverse, non-cancer health effects from exposure to groundwater.

The results of the alternate evaluation, in which COPC concentrations detected in MW-06, MW-11, MW-12, and MW-14S (ports 1 through 4) were removed from the entire aquifer data set, revealed that the potential for adverse health effects indicated by the baseline cancer risks and non-cancer hazards cannot be explained by relatively elevated concentrations detected in these onsite monitoring wells alone. In addition, even after excluding these COPC concentrations from the entire aquifer data set, a variety of COPCs have one or more elevated concentrations compared to federal or NJDEP MCLs: 13 VOCs, three SVOCs, five pesticides, PCB Aroclors, and eight metals.

Lastly, the results of the evaluation of groundwater data from ERT-5, ERT-6, and MW-18 only indicated that a portion of the potential for cancer risk and non-cancer hazard

indicated in the baseline evaluation may be attributed to concentrations of dibenzo(a,h)anthracene, total PCB Aroclors, and arsenic detected in these offsite wells.

For the evaluation of the potential for adverse health effects from resident child exposure to lead in drinking water (using the entire aquifer data set), the geometric mean PbB concentration estimated using the IEUBK model is 2.6 µg/dL. The probability that the PbB concentration is greater than 10 µg/dL is 0.22 percent. Therefore, lead concentrations in groundwater (entire aquifer) should not pose a risk to resident children or, by extension, to resident adults.

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Table 2-1
Groundwater Monitoring Wells and Screened Intervals
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Well ID	Single Screen or FLUTe™ Well Sampler Port #	Depth (feet bgs) of Screened Interval	
		Top	Bottom
Shallow Bedrock Monitoring Wells			
MW-01A	1	24	49
MW-02A	1	24	49
MW-03	1	17	32
MW-04	1	29	49
MW-05	1	25	45.5
MW-06	1	29	44
MW-07	1	43	58
MW-08	1	42	57.5
MW-09	1	29	54
MW-10	1	37	52
MW-11	1	34	59
MW-12	1	35	60
Deep Bedrock Multi-Port Monitoring Wells			
ERT-1	1	24	29
	2	33	43
	3	46	56
	4	59	64
	5	67	77
	6	100	105
	7	112	117
	8	135	140
ERT-2	1	25	35
	2	40	50
	3	54	59
	4	70	75
	5	97	107
	6	113	123
	7	127	137
ERT-3	1	27	37
	2	55	65
	3	90	105
	4	110	120
	5	124	134
	6	138	148
ERT-4	1	27	37
	2	46	56
	3	61	66
	4	83	88
	5	91	106
	6	111	116
	7	128	138
ERT-5	1	24	34
	2	37	47
	3	50	60
	4	77	87
	5	93	98
	6	120	130

Table 2-1
Groundwater Monitoring Wells and Screened Intervals
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Well ID	Single Screen or FLUTE™ Well Sampler Port #	Depth (feet bgs) of Screened Interval	
		Top	Bottom
ERT-6	1	26	36
	2	75	85
	3	93	103
	4	107	117
	5	128	138
ERT-7	1	25	35
	2	45	55
	3	65	75
	4	100	110
	5	130	140
ERT-8	1	17	27
	2	31	41
	3	44	54
	4	57	62
	5	87	97
	6	107	112
	7	135	145
MW-13	1	18	28
	2	35	45
	3	63	73
	4	95	105
	5	115	125
	6	150	160
	7	230	240
MW-14S	1	30	35
	2	41	46
	3	55	60
	4	65	70
MW-14D	1	80	85
	2	123	133
	3	199	209
MW-15S	1	30	40
	2	70	80
MW-15D	1	125	135
	2	185	195
MW-16	1	20	30
	2	40	50
	3	85	95
	4	108	118
	5	135	145
	6	170	180
	7	195	205
MW-17	1	170	180
	2	205	215
	3	235	245
MW-18	1	160	170
	2	210	220

Table 2-1
Groundwater Monitoring Wells and Screened Intervals
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Well ID	Single Screen or FLUTE™ Well Sampler Port #	Depth (feet bgs) of Screened Interval	
		Top	Bottom
MW-19	1	65	75
	2	132	142
	3	200	210
	4	257	267
	5	367	377
	6	480	490
	7	545	555
MW-20	1	25	35
	2	85	95
	3	125	135
	4	175	185
	5	205	215
	6	250	260
	7	297	307
	8	355	365
MW-21	1	50	60
	2	87	97
	3	150	160
	4	205	215
	5	260	270
	6	428	438
	7	485	495
	8	505	515
MW-22	1	45	55
	2	125	135
	3	210	220
	4	305	315
MW-23	1	60	70
	2	120	130
	3	170	180
	4	226	236
	5	258	268
	6	316	326
	7	350	360
	8	406	416
	9	444	454
Former Production Well	1	31	41
	2	46	51
	3	100	110
	4	125	135
	5	180	190
	6	200	205
	7	235	245
	8	268	278
	9	300	310

Notes:

Shallow bedrock wells or multi-port well sampler ports shaded gray indicate groundwater samples from these wells or ports were analyzed for PCB congeners and dioxins/furans.

Table 2-2
Summary of Sample Analytical Methods and Data Validation
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Groundwater Sampling Event Date	Analytical Fraction	Analytical Method *	Data Validation
October 2009, December 2010, and March 2011	TCL Volatile Organic Compounds (VOC) TCL Semi-Volatile Organic Compounds (SVOC) TCL Pesticides Polychlorinated biphenyls (PCB) Aroclors TAL Metals, Mercury (Hg), Cyanide (CN)	SOM01.2 ----- ILM05.4	CLP data validation by USEPA, Region 2 Hazardous Waste Support Branch
March-April 2010	TCL VOCs TCL SVOCs TCL Pesticides PCB Aroclors PCB Congeners TCL Dioxins/Furans TAL Metals, Hg, CN	SOM01.2 ----- CBC01.0 ----- DLM02.0 ----- ILM05.4	
July 2010	PCB Congeners TCL Dioxins/Furans	CBC01.0 ----- DLM02.0	

Notes

TCL = Target Compound List, as specified in EPA Method SOM01.2, USEPA OSWER Document 9200.5-171-FS (August 2007).

TAL = Target Analyte List, as specified in EPA Method ILM05.4, USEPA OSWER Document 9200.5-170-FS (January 2007).

*Analytical methods follow USEPA Contract Laboratory Program (CLP) statements of work.

Table 2-3
Evaluation of Reporting Limits for Chemicals Not Detected in Groundwater
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

CAS Number	Chemical	Range of Detection Limits ¹ (µg/L)	USEPA RSL for Tapwater ² (µg/L)	Basis	Maximum Reporting Limit > RSL? [Y / N]	Frequency of Reporting Limit > RSL? (%)	Range of Risk-based Screening Levels				
							noncancer		cancer		
							HQ=0.1	HQ=1	10 ⁻⁶	10 ⁻⁴	
							(µg/L)	(µg/L)	(µg/L)	(µg/L)	
Volatile Organic Compounds											
74-97-5	Bromochloromethane	0.5 - 500	8.3	nc	Y	33	0.83	8.3			
74-83-9	Bromomethane	0.5 - 500	0.87	nc	Y	18	0.87	8.7			
75-15-0	Carbon disulfide	0.5 - 500	100	nc	Y	2	100	1,000			
75-00-3	Chloroethane	0.5 - 500	2,100	nc	N	Does not exceed	2,100	21,000			
75-71-8	Dichlorodifluoromethane	0.5 - 500	20	nc	Y	24	20	200			
78-87-5	1,2-Dichloropropane	0.5 - 500	0.39	ca	Y	100			0.39	39	
10061-01-5	cis-1,3-Dichloropropene	0.5 - 500	0.43 ^a	ca	Y	100			0.43	43	
542-75-6	trans-1,3-Dichloropropene	0.5 - 500	0.43 ^a	ca	Y	100			0.43	43	
591-78-6	2-Hexanone	5 - 5,000	4.7	nc	Y	100	4.7	47			
108-10-1	4-Methyl-2-pentanone	5 - 5,000	200	nc	Y	5	200	2,000			
100-42-5	Styrene	0.5 - 500	160	nc	Y	2	160	1,600			
79-34-5	1,1,2,2-Tetrachloroethane	0.5 - 500	0.067	ca	Y	100			0.067	6.7	
Semi-Volatile Organic Compounds											
208-96-8	Acenaphthylene	0.1-0.11	NA		--	--					
1912-24-9	Atrazine	5-5.6	0.29	ca	Y	100			0.29	29	
111-91-1	Bis(2-chloroethoxy)methane	5-5.6	11	nc	N	Does not exceed	11	110			
111-44-4	Bis(2-chloroethyl)ether	5-5.6	0.012	ca	Y	100			0.012	1.2	
101-55-3	4-Bromophenyl phenyl ether	5-5.6	NA		--	--					
85-68-7	Butylbenzylphthalate	5-5.6	35	ca	N	Does not exceed			35	3,500	
59-50-7	4-Chloro-3-methylphenol	5-5.6	370	nc	N	Does not exceed	370	3,700			
106-47-8	4-Chloroaniline	5-5.6	0.34	ca	Y	100			0.34	34	
91-58-7	2-Chloronaphthalene	5-5.6	290	nc	N	Does not exceed	290	2,900			
7005-72-3	4-Chlorophenyl phenyl ether	5-5.6	NA		--	--					
132-84-9	Dibenzofuran	5-5.6	3.7	nc	Y	100	3.7	37			
91-94-1	3,3'-Dichlorobenzidine	5-5.6	0.15	ca	Y	100			0.15	15	
105-87-9	2,4-Dimethylphenol	5-5.6	73	nc	N	Does not exceed	73	730			
84-74-2	Di-n-butylphthalate	5-5.6	370	nc	N	Does not exceed	370	3,700			
117-84-0	Di-n-octylphthalate	5-5.6	NA		--	--					
534-52-1	4,6-Dinitro-2-methylphenol	10-11	0.29	nc	Y	100	0.29	2.9			
51-28-5	2,4-Dinitrophenol	10-11	7.3	nc	Y	100	7.3	73			
121-14-2	2,4-Dinitrotoluene	5-5.6	0.22	ca	Y	100			0.22	22	
606-20-2	2,6-Dinitrotoluene	5-5.6	3.7	nc	Y	100	3.7	37			
118-74-1	Hexachlorobenzene	5-5.6	0.042	ca	Y	100			0.042	4.2	
87-68-3	Hexachlorobutadiene	5-5.6	0.86	ca	Y	100			0.86	86	
77-47-4	Hexachlorocyclopentadiene	5-5.6	22	nc	N	Does not exceed	22	220			
87-72-1	Hexachloroethane	5-5.6	3.7	nc	Y	100	3.7	37			
78-59-1	Isophorone	5-5.6	71	ca	N	Does not exceed			71	7,100	
95-48-7	2-Methylphenol	5-5.6	180	nc	N	Does not exceed	180	1,800			
106-44-5	4-Methylphenol	5-5.6	18	nc	N	Does not exceed	18	180			
88-74-4	2-Nitroaniline	10-11	37	nc	N	Does not exceed	37	370			
99-09-2	3-Nitroaniline	10-11	NA		--	--					
100-01-6	4-Nitroaniline	10-11	3.4	ca	Y	100			3.4	340	
98-95-3	Nitrobenzene	5-5.6	0.12	ca	Y	100			0.12	12	
88-75-5	2-Nitrophenol	5-5.6	NA		--	--					
100-02-7	4-Nitrophenol	10-11	NA		--	--					
621-84-7	n-Nitroso-di-n-propylamine	5-5.6	0.0096	ca	Y	100			0.0096	0.96	
86-30-6	n-Nitrosodiphenylamine	5-5.6	14	ca	N	Does not exceed			14	1,400	
52438-91-2	2,2'-Oxybis(1-chloropropane)	5-5.6	NA		--	--					
58-90-2	2,3,4,6-Tetrachlorophenol	5-5.6	110	nc	N	Does not exceed	110	1,100			
95-95-4	2,4,5-Trichlorophenol	5-5.6	370	nc	N	Does not exceed	370	3,700			
88-06-2	2,4,6-Trichlorophenol	5-5.6	3.7	nc	Y	100	3.7	37			
Polychlorinated biphenyls (PCB) Aroclors											
11104-28-2	Aroclor 1221	0.01 - 90	0.0068	ca	Y	100			0.0068	0.68	
11141-16-5	Aroclor 1232	0.01 - 90	0.0068	ca	Y	100			0.0068	0.68	
53469-21-9	Aroclor 1242	0.01 - 90	0.034	ca	Y	100			0.034	3.4	
11096-82-5	Aroclor 1260	0.01 - 90	0.034	ca	Y	100			0.034	3.4	
37324-23-5	Aroclor 1262	0.01 - 90	NA		--	--					
11100-14-4	Aroclor 1268	0.01 - 90	NA		--	--					
Pesticides											
309-00-2	Aldrin	0.05 - 26	0.004	ca	Y	100			0.004	0.4	
5103-71-9	alpha-Chlordane	0.05 - 26	NA		--	--					
19595-59-6	Endosulfen I	0.05 - 26	NA		--	--					
53494-70-5	Endrin ketone	0.01 - 51	NA		--	--					
8001-35-2	Toxaphene	5 - 2,600	0.061	ca	Y	100			0.061	6.1	
Inorganic Compounds											
7440-28-0	Thallium	1 - 2	0.037	nc	Y	100	0.037	0.37			

Notes

¹ Detection limits are equivalent to reporting limits.

² The USEPA Regional Screening Levels (RSL) for tapwater are from May 2011 (USEPA, 2011a) and are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = RSL is for 1,3-dichloropropene

NA = Not Available

Table 2-4
Summary of Wells Included in Each Shallow Groundwater Data Set
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Groundwater Data Set	Well ID	Single Screen or FLUTe™ Well Port #	Depth Interval (feet bgs)	
			Top	Bottom
Shallow Onsite	ERT-1	1	24	29
	FPW	1	31	41
	MW-01A	1	24	49
	MW-02A	1	24	49
	MW-03	1	17	32
	MW-04	1	29	49
	MW-05	1	25	45.5
	MW-06	1	29	44
	MW-07	1	43	58
	MW-08	1	42	57.5
	MW-09	1	29	54
	MW-10	1	37	52
	MW-11	1	34	59
	MW-12	1	35	60
	MW-14S	1	30	35
	MW-15S	1	30	40
	MW-16	1	20	30
Shallow Offsite South of Bound Brook	ERT-5	1	24	34
	ERT-6	1	26	36
	ERT-7	1	25	35
	ERT-2	1	25	35
Shallow Offsite North of Bound Brook	ERT-3	1	27	37
	ERT-4	1	27	37
	MW-13	1	18	28
	MW-19	1	65	75
	MW-20	1	25	35
	MW-21	1	50	60
	MW-22	1	45	55
	MW-23	1	31	41

Notes

Groundwater data from ERT-8 were not included because it is an upgradient well representative of background conditions.

Table 2-5
Summary of Chemicals of Potential Concern (COPC) in Groundwater Data Sets
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Groundwater Data Set:	Entire Aquifer	Shallow Onsite Groundwater	Shallow Offsite Groundwater South of Bound Brook	Shallow Offsite Groundwater North of Bound Brook
Corresponding RAGS Part D Table:	Table 2.1	Table 2.2	Table 2.3	Table 2.4
<i>Volatile Organic Chemicals</i>				
Benzene	X	X	X	X
Bromodichloromethane	X	O	--	X
Chlorobenzene	X	X	--	--
Chloroform	X	X	X	X
1,2-Dibromo-3-chloropropane	O	X	--	--
Dibromochloromethane	X	X	X	--
1,2-Dichlorobenzene	X	X	--	--
1,3-Dichlorobenzene	X	X	--	--
1,4-Dichlorobenzene	X	X	--	--
1,1-Dichloroethane	X	X	--	O
1,2-Dichloroethane	X	X	--	--
1,1-Dichloroethene	X	X	--	O
cis-1,2-Dichloroethene	X	X	X	X
trans-1,2-Dichloroethene	X	X	--	--
Ethylbenzene	O	X	--	--
Methyl tert-butyl ether	X	O	X	O
Methylcyclohexane	O	X	--	--
Methylene chloride	X	X	--	O
Tetrachloroethene	X	X	X	X
1,2,3-Trichlorobenzene	X	X	--	--
1,2,4-Trichlorobenzene	X	X	--	--
1,1,2-Trichloroethane	X	X	--	--
Trichloroethene	X	X	X	X
Vinyl chloride	X	X	--	X
o-Xylene	O	X	--	--
<i>Semi-Volatile Organic Chemicals</i>				
Benzo(a)anthracene	O	X	--	--
Benzo(a)pyrene	O	X	--	--
Benzo(b)fluoranthene	O	X	--	--
Benzo(g,h,i)perylene	O	X	--	X
Benzo(k)fluoranthene	O	X	--	--
1,1-Biphenyl	O	X	--	--
Bis(2-ethylhexyl)phthalate	X	O	O	X
Dibenzo(a,h)anthracene	X	X	X	--
Indeno(1,2,3-cd)pyrene	X	X	X	X
Naphthalene	X	X	X	X
Phenanthrene	O	X	--	--
<i>Polychlorinated Biphenyls (PCB) Aroclors and Pesticides</i>				
Total PCB Aroclors	X	X	X	X
alpha-BHC	O	X	--	--
beta-BHC	O	O	--	X
delta-BHC	O	X	--	X
gamma-BHC	O	X	--	--
gamma-Chlordane	X	X	--	--
4,4'-DDD	X	X	--	X
4,4'-DDE	X	X	--	X
4,4'-DDT	X	X	--	X
Dieldrin	O	X	--	--
Endosulfan II	O	X	--	--
Endosulfan sulfate	O	X	--	--
Endrin aldehyde	O	X	--	--
Heptachlor	X	X	--	X
<i>PCB Congeners and Dioxin/Furan Congeners</i>				
2,3,7,8-TCDD Toxic Equivalence	X	X	X	O
<i>Inorganic Chemicals</i>				
Aluminum	X	X	O	O
Antimony	O	O	--	X
Arsenic	X	X	X	X
Barium	X	X	X	O
Cadmium	X	X	--	O
Chromium	X	X	X	X
Cobalt	X	X	O	X
Iron	X	X	O	O
Lead	X	X	O	X
Manganese	X	X	X	X
Vanadium	X	X	O	X

Notes

X = Chemical was identified as a COPC in the corresponding groundwater data set.

O = Chemical was detected but not identified as a COPC in the corresponding groundwater data set.

-- = Chemical was not detected in the corresponding groundwater data set.

Table 7-1
Summary Table: Human Health Cancer Risks and Noncancer Hazards for RME Scenario
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Exposure Medium	Human Receptor Population	Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices			
		Exposure Routes			Receptor Total	Exposure Routes			Receptor Total
		Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation	
Entire Aquifer	Commercial/Industrial Worker	N/A	5E-03	3E-03	8E-03	N/A	1E+02	2E+01	1E+02
Shallow Onsite Groundwater	Construction/Utility Worker	N/A	5E-05	5E-08	5E-05	N/A	7E+01	4E-03	7E+01
Shallow Offsite Groundwater, South Bound Brook	Construction/Utility Worker	N/A	3E-05	2E-09	3E-05	N/A	2E+01	4E-05	2E+01
Shallow Offsite Groundwater, North Bound Brook	Construction/Utility Worker	N/A	8E-07	5E-10	8E-07	N/A	3E+00	2E-05	3E+00
Entire Aquifer	Resident Adult	6E-03	1E-02	1E-03	2E-02	2E+02	1E+02	4E+00	4E+02
Entire Aquifer	Resident Child	2E-03	4E-03	5E-04	7E-03	5E+02	3E+02	1E+01	8E+02

Notes

N/A - Not applicable

Table 7-2
Summary Table: Human Health Cancer Risks and Noncancer Hazards for CTE Scenario
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Exposure Medium	Human Receptor Population	Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices			
		Exposure Routes			Receptor Total	Exposure Routes			Receptor Total
		Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation	
Entire Aquifer	Commercial/Industrial Worker	N/A	1E-03	4E-04	2E-03	N/A	9E+01	9E+00	1E+02
Shallow Onsite Groundwater	Construction/Utility Worker	N/A	1E-05	1E-08	1E-05	N/A	6E+01	3E-03	6E+01
Shallow Offsite Groundwater, South Bound Brook	Construction/Utility Worker	N/A	8E-06	6E-10	8E-06	N/A	2E+01	3E-05	2E+01
Shallow Offsite Groundwater, North Bound Brook	Construction/Utility Worker	N/A	2E-07	1E-10	2E-07	N/A	3E+00	2E-05	3E+00
Entire Aquifer	Resident Adult	7E-04	2E-03	5E-05	2E-03	1E+02	9E+01	8E-01	2E+02
Entire Aquifer	Resident Child	1E-03	2E-03	6E-05	3E-03	3E+02	2E+02	1E+00	4E+02

Notes

N/A - Not applicable

Table 7-3
Qualitative Evaluation of Volatile Chemicals Detected in Shallow Groundwater
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Volatile Chemical Detected in Groundwater	Henry's Law Constant (H')	USEPA Regional Screening Level for Resident Air ¹	Shallow Onsite Groundwater			Shallow Offsite, South Bound Brook Groundwater			Shallow Offsite, North Bound Brook Groundwater		
			Maximum Detected Concentration ²	Source Vapor Concentration ³	Hypothetical Attenuation Factor (Source Vapor-Outdoor Air) ⁴	Maximum Detected Concentration ²	Source Vapor Concentration ³	Hypothetical Attenuation Factor (Source Vapor-Outdoor Air) ⁴	Maximum Detected Concentration ²	Source Vapor Concentration ³	Hypothetical Attenuation Factor (Source Vapor-Outdoor Air) ⁴
	(unitless)	(µg/m ³)	(µg/L)	(µg/m ³)	(unitless)	(µg/L)	(µg/m ³)	(unitless)	(µg/L)	(µg/m ³)	(unitless)
Acetone	1.6E-03	3.2E+04	2.4E+01	3.8E+01	None	ND	--	--	2.3E+02	3.7E+02	None
Benzene	2.3E-01	3.1E-01	2.4E+01	5.5E+03	6E-05	5.0E-01	1.1E+02	3E-03	1.8E+00	4.1E+02	8E-04
Bromodichloromethane	6.6E-02	6.6E-02	4.7E-01	3.1E+01	2E-03	ND	--	--	7.0E-01	4.6E+01	1E-03
Bromoform	2.2E-02	2.2E+00	2.9E+00	6.4E+01	3E-02	1.8E+00	3.9E+01	6E-02	ND	--	--
2-Butanone	2.3E-03	5.2E+03	5.5E+00	1.3E+01	None	ND	--	--	ND	--	--
Chlorobenzene	1.5E-01	5.2E+01	6.5E+01	9.9E+03	5E-03	ND	--	--	ND	--	--
Chloroform	1.5E-01	1.1E-01	1.9E+01	2.9E+03	4E-05	1.1E+00	1.7E+02	7E-04	3.0E+00	4.5E+02	2E-04
Cyclohexane	6.1E+00	6.3E+03	1.3E+01	8.0E+04	8E-02	ND	--	--	ND	--	--
1,2-Dibromo-3-chloropropane	6.0E-03	1.6E-04	3.9E-01	2.3E+00	7E-05	ND	--	--	ND	--	--
Dibromochloromethane	3.2E-02	9.0E-02	1.2E+00	3.9E+01	2E-03	5.1E-01	1.6E+01	5E-03	ND	--	--
1,2-Dibromoethane	2.7E-02	4.1E-03	1.0E-02	2.7E-01	2E-02	ND	--	--	ND	--	--
1,2-Dichlorobenzene	7.8E-02	2.1E+02	5.6E+01	4.4E+03	5E-02	ND	--	--	ND	--	--
1,3-Dichlorobenzene	1.1E-01	NA	1.2E+02	1.3E+04	NA	ND	--	--	ND	--	--
1,4-Dichlorobenzene	1.0E-01	2.2E-01	1.1E+02	1.1E+04	2E-05	ND	--	--	ND	--	--
1,1-Dichloroethane	2.3E-01	1.5E+00	1.1E+01	2.5E+03	6E-04	ND	--	--	2.8E-01	6.4E+01	2E-02
1,2-Dichloroethane	4.0E-02	9.4E-02	1.5E+01	6.0E+02	2E-04	ND	--	--	ND	--	--
1,1-Dichloroethene	1.1E+00	2.1E+02	2.8E+02	3.0E+05	7E-04	ND	--	--	2.2E+00	2.4E+03	9E-02
cis-1,2-Dichloroethene	1.7E-01	NA	3.9E+05	6.5E+07	NA	3.1E+01	5.2E+03	NA	1.1E+02	1.8E+04	NA
trans-1,2-Dichloroethene	3.9E-01	6.3E+01	1.3E+03	5.0E+05	1E-04	ND	--	--	ND	--	--
Ethylbenzene	3.2E-01	9.7E-01	2.0E+01	6.5E+03	2E-04	ND	--	--	ND	--	--
Isopropylbenzene	4.7E-01	4.2E+02	5.1E+00	2.4E+03	2E-01	ND	--	--	ND	--	--
Methyl tert-butyl ether	2.4E-02	9.4E+00	1.3E+00	3.1E+01	3E-01	3.3E+02	7.9E+03	1E-03	4.4E+00	1.1E+02	9E-02
Methylcyclohexane	1.8E+01	NA	4.2E+01	7.4E+05	NA	ND	--	--	ND	--	--
Methylene chloride	9.0E-02	5.2E+00	7.0E+00	6.3E+02	8E-03	ND	--	--	3.3E+00	3.0E+02	2E-02
Naphthalene	2.0E-02	7.2E-02	6.5E+00	1.3E+02	6E-04	1.8E-01	3.6E+00	2E-02	1.6E-01	3.2E+00	2E-02
Tetrachloroethene	7.5E-01	4.1E-01	1.6E+03	1.2E+06	3E-07	1.9E+00	1.4E+03	3E-04	8.1E-01	6.1E+02	7E-04
Toluene	2.7E-01	5.2E+03	5.2E+01	1.4E+04	4E-01	5.2E-01	1.4E+02	None	2.7E+01	7.3E+03	7E-01
1,1,2-Trichloro-1,2,2-trifluoroethane	2.2E+01	3.1E+04	2.2E+00	4.7E+04	7E-01	ND	--	--	ND	--	--
1,2,3-Trichlorobenzene	5.1E-02	NA	2.8E+02	1.4E+04	NA	ND	--	--	ND	--	--
1,2,4-Trichlorobenzene	5.8E-02	2.1E+00	1.6E+03	9.3E+04	2E-05	ND	--	--	ND	--	--
1,1,1-Trichloroethane	7.1E-01	5.2E+03	3.2E-01	2.3E+02	None	ND	--	--	4.1E-01	2.9E+02	None
1,1,2-Trichloroethane	3.7E-02	1.5E-01	1.2E+02	4.5E+03	3E-05	ND	--	--	ND	--	--
Trichloroethene	4.2E-01	1.2E+00	1.7E+05	7.2E+07	2E-08	1.8E+03	7.6E+05	2E-06	3.1E+02	1.3E+05	9E-06
m,p-Xylene	3.0E-01	7.3E+02	1.2E+01	3.6E+03	2E-01	ND	--	--	ND	--	--
o-Xylene	2.1E-01	7.3E+02	8.5E+01	1.8E+04	4E-02	ND	--	--	ND	--	--
Vinyl chloride	1.1E+00	1.6E-01	8.6E+02	9.5E+05	2E-07	ND	--	--	3.6E-01	4.0E+02	4E-04

Note

Sources of Henry's Law Constants are USEPA (1996b) and USDOE (2011).

¹ USEPA RSLs for Resident Air are from November 2010 (USEPA, 2010a) and are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1.

² Maximum detected concentrations in the "Shallow Onsite Groundwater," "Shallow Offsite, South Bound Brook Groundwater," and "Shallow Offsite, North Bound Brook Groundwater" data sets are presented in Appendix A, RAGS Part D Tables 2.3, 2.4, and 2.5, respectively.

³ Source vapor concentrations were calculated using the following equation (USEPA, 2003c): Source vapor (µg/m³) = H' * Max groundwater concentration (µg/L) * 1E+03 L/m³.

⁴ Hypothetical attenuation factors (source vapor-outdoor air) were calculated as the ratio of the USEPA RSL for Resident Air to the source vapor concentration.



LEGEND

- Property Boundary
- Bound Brook

0 250 500 1,000 Feet

Source: New Jersey Geographic Information Network (NJ 2007 Ortho Imagery)

MALCOLM
PIRNIE

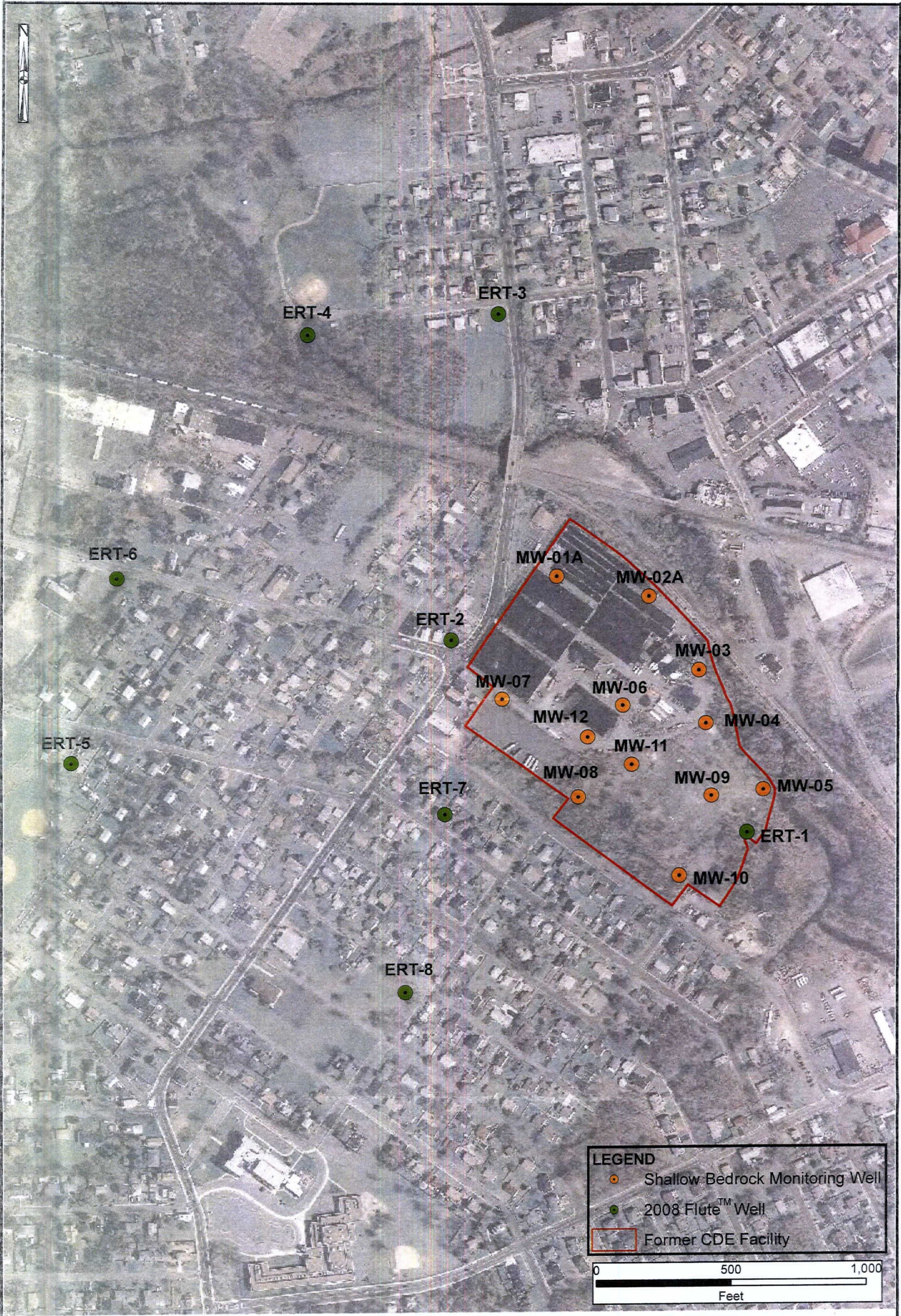


Cornell-Dubilier Electronics
Superfund Site

South Plainfield, NJ

AERIAL PHOTOGRAPH

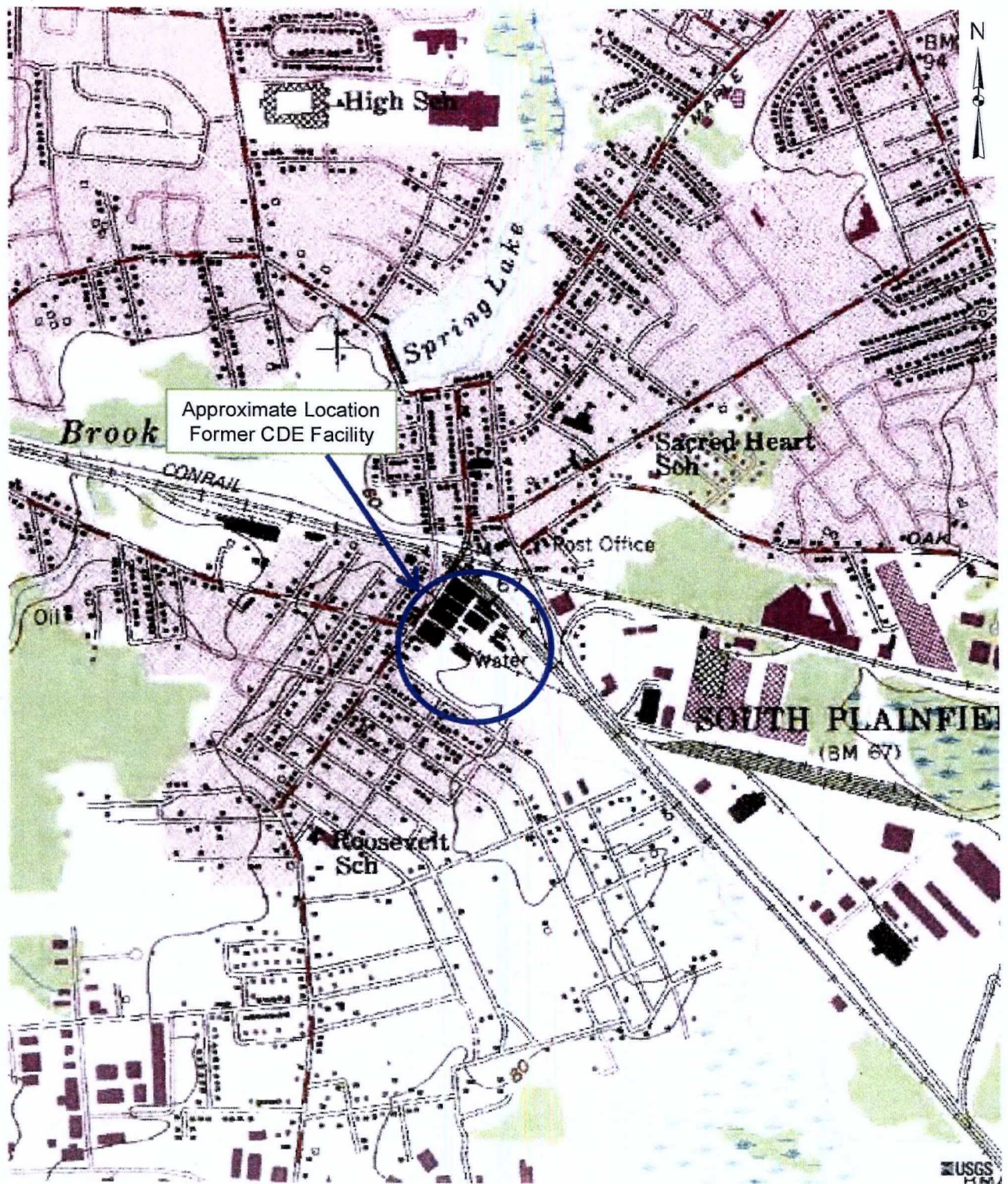
FIGURE 1-1



Cornell-Dubilier Electronics
Superfund Site
South Plainfield, New Jersey

Groundwater Monitoring Wells
from Previous OU3
Investigations

FIGURE 1-2



Source: Microsoft Research Maps
(1986 Image)

Scale: 1" = 24,000 feet

**MALCOLM
PIRNIE**

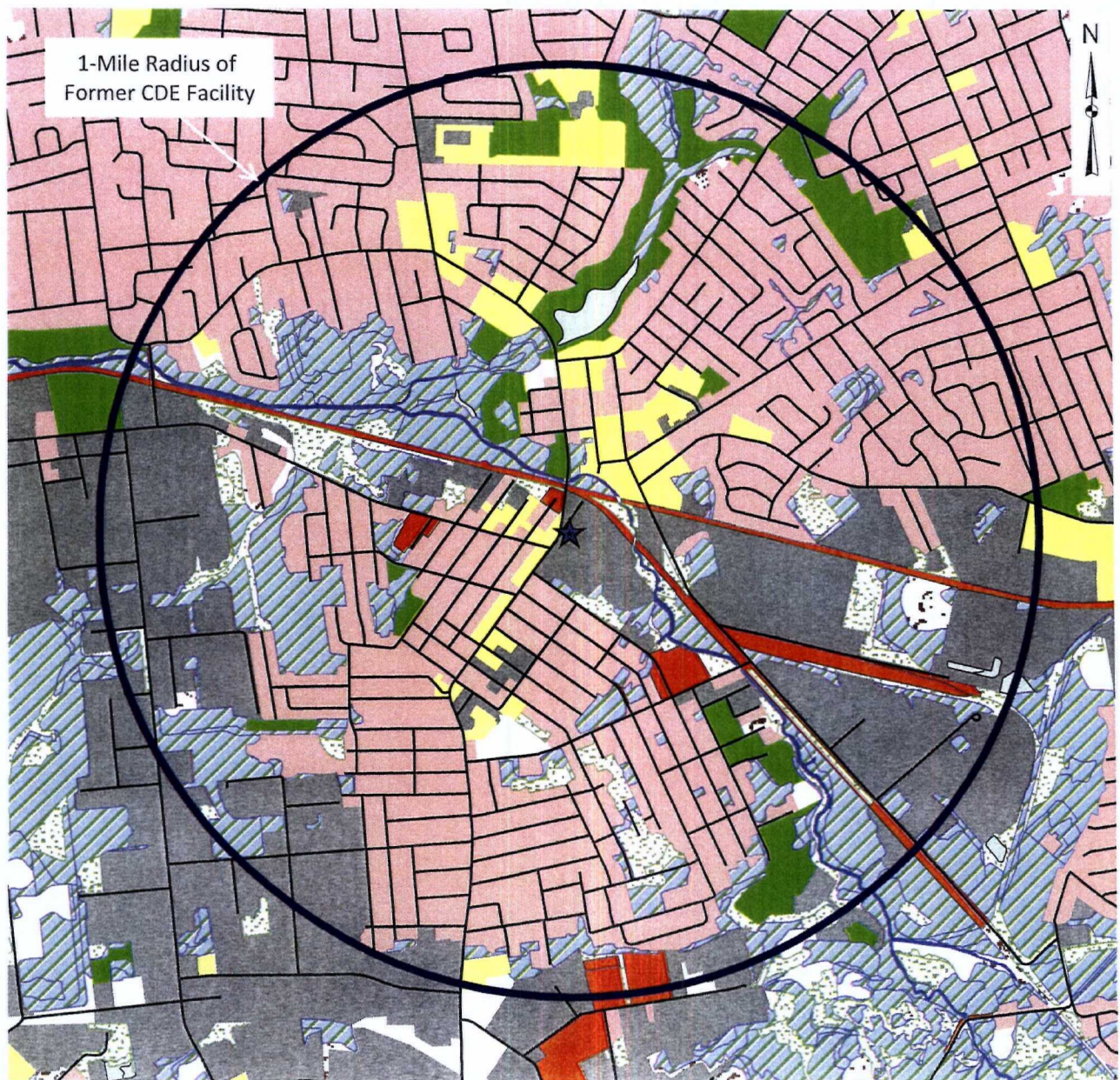


Cornell-Dubilier Electronics
Superfund Site

South Plainfield, NJ

TOPOGRAPHIC MAP

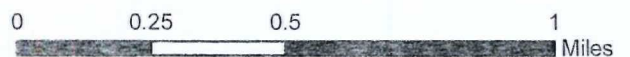
FIGURE 1-3



LEGEND

NJDEP 2002 Land Use/Land Cover	Commercial/Services	Transportation/Communication	★ Former CDE Facility
Wetlands	Scrub/Shrub	Residential	
Natural/Artificial Lakes	Forested	Streams	
Field/Cemetery	Urban/Industrial		

Source: NJDEP Bureau of Geographic Information Systems
(Updated as of March 10, 2008)



**MALCOLM
PIRNIE**



Cornell-Dubilier Electronics
Superfund Site

South Plainfield, NJ

LAND USE / LAND
COVER TYPES

FIGURE 1-4

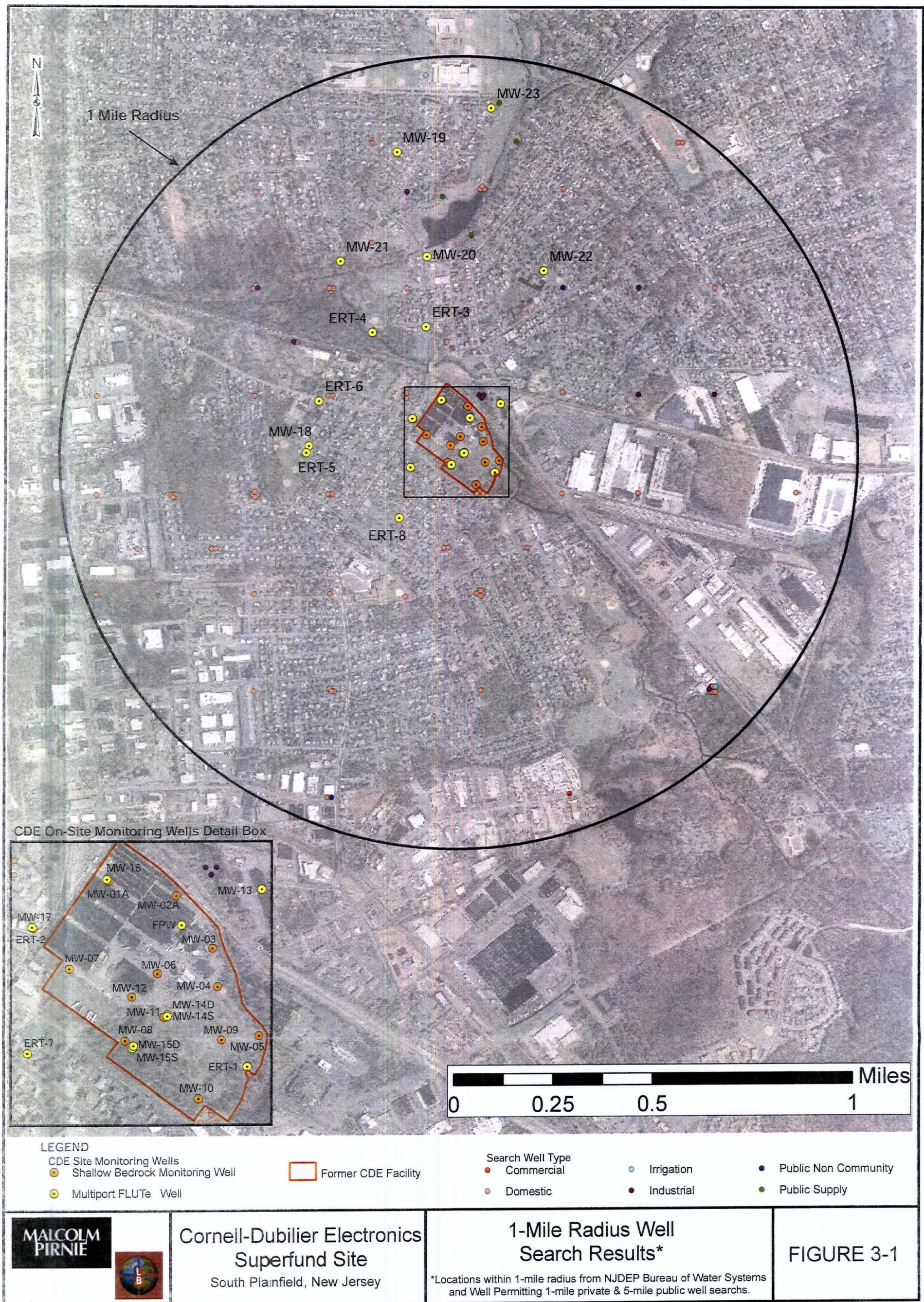


Cornell-Dubilier Electronics
Superfund Site
South Plainfield, New Jersey

OU3 Groundwater Monitoring
Well Locations

FIGURE 2-1

Map Document (P:\4553058\GIS\Well_Search_RiskAssessment\Final.mxd)
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APPENDIX A

RAGS Part D Tables

TABLE 1
SELECTION OF EXPOSURE PATHWAYS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Groundwater	Entire Aquifer	Within and Outside the Boundaries of the Former CDE Facility - Tap Water and/or Process Water	Commercial / Industrial Worker	Adult	Dermal Contact	Quant	Potable, sanitary, and/or process use of the groundwater.
						Inhalation	Quant	
		Shallow Groundwater	Within and Outside the Boundaries of the Former CDE Facility - Top of the Groundwater Table	Construction/Utility Worker	Adult	Dermal Contact	Quant	Direct contact with bedrock groundwater during construction activities is unlikely. However, groundwater has been observed at depths less than 10 feet below ground surface, and shallow groundwater in the overburden may be hydraulically connected to groundwater in the highly fractured bedrock. This exposure scenario is therefore evaluated using the shallow bedrock groundwater data.
						Inhalation	Quant	
		Entire Aquifer	Outside the Boundaries of the Former CDE Facility - Tap Water	Resident	Adult	Ingestion	Quant	Potable and/or sanitary use of the groundwater.
						Dermal Contact	Quant	
						Inhalation	Quant	
				Child		Ingestion	Quant	Potable and/or sanitary use of the groundwater.
						Dermal Contact	Quant	
						Inhalation	Quant	
		Air	Within and Outside the Boundaries of the Former CDE Facility - Vapors in Indoor Air	Commercial / Industrial Worker	Adult	Inhalation	None	Volatile chemicals in groundwater may enter indoor spaces through building foundations. However, this exposure pathway is being addressed by the USEPA separate from the RI.
			Outside the Boundaries of the Former CDE Facility - Vapors in Indoor Air	Resident	Adult	Inhalation	None	Volatile chemicals in groundwater may enter indoor spaces through building foundations. However, this exposure pathway is being addressed by the USEPA separate from the RI.
					Child	Inhalation	None	
			Within and Outside the Boundaries of the Former CDE Facility - Vapors in Outdoor Air	Commercial / Industrial Worker	Adult	Inhalation	Qual	Volatile chemicals in groundwater may volatilize and be passively released to outdoor air. However, as there are uncertainties associated with quantitatively modeling ambient air concentrations following volatilization from groundwater that may include DNAPL in fractured bedrock, the analysis is qualitative.
				Construction/Utility Worker	Adult	Inhalation	Qual	
			Outside the Boundaries of the Former CDE Facility - Vapor in Outdoor Air	Resident	Adult	Inhalation	Qual	
					Child	Inhalation	Qual	
		Surface Water	Bound Brook	Recreationist	Adolescent	Ingestion	None	Exposure pathways related to surface water and sediment will be addressed in OU4.
						Dermal Contact	None	
						Inhalation	None	
		Sediment	Bound Brook	Recreationist	Adolescent	Ingestion	None	
						Dermal Contact	None	
						Inhalation	None	

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Within and Outside the Boundaries of the Former CDE Facility - Process or Tap Water	67-64-1	Acetone	0.82 J	530	µg/L	MW-21-03	53 / 261	5 - 5,000	530	--	2,200	nc	NA	--	N	2
	71-43-2	Benzene	0.13 J	24	µg/L	MW-11	31 / 261	0.5 - 500	24	--	0.41	ca	1	NJDEP MCL	Y	1
	75-27-4	Bromodichloromethane	0.14 J	1.7	µg/L	MW-13-03	23 / 260	0.5 - 500	1.7	--	0.12	ca	80	Federal MCL	Y	1
	75-25-2	Bromoform	0.37 J	2.9	µg/L	MW-03	19 / 258	0.5 - 500	2.9	--	8.5	ca	80	Federal MCL	N	2
	78-93-3	2-Butanone	1.8 J	39	µg/L	MW-14D-02	14 / 257	5 - 5,000	39	--	710	nc	NA	--	N	2
	56-23-5	Carbon tetrachloride	0.25 J	0.72 J	µg/L	MW-16-03	9 / 261	0.5 - 500	0.72	--	0.44	ca	2	NJDEP MCL	N	1,4
	108-90-7	Chlorobenzene	0.21 J	65	µg/L	MW-09	31 / 261	0.5 - 500	65	--	9.1	nc	50	NJDEP MCL	Y	1
	67-66-3	Chloroform	0.24 J	150 J	µg/L	MW-14S-02	97 / 261	0.5 - 500	150	--	0.19	ca	80	Federal MCL	Y	1
	74-87-3	Chloromethane	0.62 J	1.3	µg/L	ERT-1-08	2 / 261	0.5 - 500	1.3	--	19	nc	NA	--	N	2,4
	110-82-7	Cyclohexane	0.2 J	13	µg/L	MW-11	11 / 261	0.5 - 500	13	--	1,300	nc	NA	--	N	2,4
	96-12-8	1,2-Dibromo-3-chloropropane	0.037 J	0.39 J	µg/L	MW-11	9 / 260	0.05 - 0.5	0.39	--	0.00032	ca	0.2	Federal MCL	N	1,4
	124-48-1	Dibromochloromethane	0.21 J	1.2	µg/L	MW-03	18 / 261	0.5 - 500	1.2	--	0.15	ca	80	Federal MCL	Y	1
	106-93-4	1,2-Dibromoethane	0.01 J	0.01 J	µg/L	MW-03	1 / 261	0.05 - 500	0.01	--	0.0065	ca	0.05	Federal MCL	N	1,4
	95-50-1	1,2-Dichlorobenzene	0.15 J	56	µg/L	MW-12	25 / 258	0.5 - 500	56	--	37	nc	600	Federal MCL	Y	1
	541-73-1	1,3-Dichlorobenzene	0.015 J	120	µg/L	MW-12	32 / 258	0.5 - 500	120	--	NA	ca	600	NJDEP MCL	Y	5
	106-46-7	1,4-Dichlorobenzene	0.25 J	110	µg/L	MW-12	34 / 258	0.5 - 500	110	--	0.43	ca	75	Federal MCL	Y	1
	75-34-3	1,1-Dichloroethane	0.105 J	26 J	µg/L	FPW-02	67 / 261	0.5 - 500	26	--	2.4	ca	50	NJDEP MCL	Y	1
	107-06-2	1,2-Dichloroethane	0.22 J	15	µg/L	MW-11	27 / 261	0.5 - 500	15	--	0.15	ca	2	NJDEP MCL	Y	1
	75-35-4	1,1-Dichloroethene	0.22 J	280 J	µg/L	MW-11	92 / 261	0.5 - 500	280	--	34	nc	2	NJDEP MCL	Y	1
	156-59-2	cis-1,2-Dichloroethene	0.25 J	390,000 J	µg/L	MW-11	224 / 261	0.5 - 500	390,000	--	7.3	nc	70	Federal MCL	Y	1
	156-60-5	trans-1,2-Dichloroethene	0.11 J	1,300 J	µg/L	MW-11	84 / 261	0.5 - 500	1,300	--	11	nc	100	Federal MCL	Y	1
	100-41-4	Ethylbenzene	0.43 J	20	µg/L	MW-11	5 / 261	0.5 - 500	20	--	1.5	ca	700	Federal MCL	N	1,4
	98-82-8	Isopropylbenzene	0.2 J	5.1 J	µg/L	MW-11	3 / 261	0.5 - 500	5.1	--	68	nc	NA	--	N	2,4
	79-20-9	Methyl acetate	3.4 J	3.4 J	µg/L	MW-16-06	1 / 261	0.5 - 500	3.4	--	3,700	nc	NA	--	N	2,4
	1634-04-4	Methyl tert-butyl ether	0.1 J	330	µg/L	ERT-2-01	111 / 261	0.5 - 500	330	--	12	ca	70	NJDEP MCL	Y	1
	108-87-2	Methylcyclohexane	0.14 J	42	µg/L	MW-11	11 / 260	0.5 - 500	42	--	NA	ca	NA	--	N	4,5
	75-09-2	Methylene chloride	0.23 J	7 J	µg/L	MW-11	21 / 261	0.5 - 500	7.0	--	4.8	ca	3	NJDEP MCL	Y	1
	127-18-4	Tetrachloroethene	0.12 J	1,600	µg/L	MW-06	112 / 261	0.5 - 500	1,600	--	0.11	ca	1	NJDEP MCL	Y	1
	108-88-3	Toluene	0.13 J	86	µg/L	MW-21-07	139 / 261	0.5 - 500	86	0.66 - 33 E	230	nc	1,000	Federal MCL	N	2
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.2	2.2	µg/L	MW-01A	3 / 261	0.5 - 500	2.2	--	5,900	nc	NA	--	N	2,4
	87-61-6	1,2,3-Trichlorobenzene	0.12 J	280	µg/L	MW-12	36 / 258	0.5 - 500	280	--	2.9	nc	NA	--	Y	1
	120-82-1	1,2,4-Trichlorobenzene	0.1 J	1,600 J	µg/L	MW-12	44 / 258	0.5 - 500	1,600	--	0.41	nc	9	NJDEP MCL	Y	1
	71-55-6	1,1,1-Trichloroethane	0.062 J	1	µg/L	MW-22-03	23 / 261	0.5 - 500	1.0	--	910	nc	30	NJDEP MCL	N	2
	79-00-5	1,1,2-Trichloroethane	0.27	120	µg/L	MW-11	26 / 261	0.5 - 500	120	--	0.24	ca	3	NJDEP MCL	Y	1
	79-01-6	Trichloroethene	0.28 J	170,000	µg/L	MW-11	237 / 261	0.5 - 500	170,000	0.29 J - 0.54	2.0	ca	1	NJDEP MCL	Y	1
	75-69-4	Trichlorofluoromethane	0.3 J	1.1	µg/L	MW-17-02	4 / 261	0.5 - 500	1.1	--	130	nc	NA	--	N	2,4
	1330-20-7	m,p-Xylene	0.41 J	15	µg/L	MW-17-01	5 / 261	0.5 - 500	15	--	20	nc	1,000	NJDEP MCL	N	2,4
	1330-20-7	o-Xylene	0.33 J	85	µg/L	MW-11	8 / 261	0.5 - 500	85	--	20	nc	1,000	NJDEP MCL	N	1,4
	75-01-4	Vinyl chloride	0.36 J	860 J	µg/L	MW-11	64 / 261	0.5 - 500	860	--	0.016	ca	2	Federal MCL	Y	1

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Within and Outside the Boundaries of the Former CDE Facility - Process or Tap Water	83-32-9	Acenaphthene	0.13	0.39	µg/L	MW-02A	5 / 262	0.1-0.11	0.39	--	220	nc	NA	--	N	2,4
	98-86-2	Acetophenone	1.6 J	2.8 J	µg/L	MW-14S-04	2 / 262	5-5.6	2.8	--	370	nc	NA	--	N	2,4
	120-12-7	Anthracene	0.12	0.49 J	µg/L	MW-06	2 / 262	0.1 - 5	0.49	--	1,100	nc	NA	--	N	2,4
	100-52-7	Benzaldehyde	4.2 J	7.2	µg/L	MW-14S-01	2 / 261	5-5.6	7.2	--	370	nc	NA	--	N	2,4
	56-55-3	Benzo(a)anthracene	0.081 J	1.7	µg/L	MW-06	3 / 262	0.1-0.11	1.7	--	0.029	ca	NA	--	N	1,4
	50-32-8	Benzo(a)pyrene	0.14	4.3 J	µg/L	ERT-1-06	7 / 262	0.1 - 5	4.3	--	0.0029	ca	0.2	Federal MCL	N	1,4
	205-99-2	Benzo(b)fluoranthene	0.082 J	3 J	µg/L	ERT-1-06	9 / 261	0.1 - 5	3.0	--	0.029	ca	NA	--	N	1,4
	191-24-2	Benzo(g,h,i)perylene	0.086 J	2.6 J	µg/L	ERT-1-06	12 / 261	0.1 - 5	2.6	--	NA	ca	NA	--	N	4,5
	207-08-9	Benzo(k)fluoranthene	0.091 J	3.5 J	µg/L	ERT-1-06	9 / 262	0.1 - 5	3.5	--	0.29	ca	NA	--	N	1,4
	92-52-4	1,1'-Biphenyl	1.1 J	17	µg/L	MW-14S-04	4 / 262	5-5.6	17	--	0.083	nc	NA	--	N	1,4
	117-81-7	bis(2-Ethylhexyl)phthalate	1.1 J	220	µg/L	MW-23-02	29 / 262	5-5.6	26	3.2 J - 6.8	4.8	ca	6	Federal MCL	Y	1
	105-60-2	Caprolactam	2 J	95	µg/L	MW-13-07	39 / 262	5-5.6	95	--	1,800	nc	NA	--	N	2
	86-74-8	Carbazole	0.54 J	0.54 J	µg/L	MW-06	1 / 262	5-5.6	0.54	--	NA	nc	NA	--	N	4,5
	95-57-8	2-Chlorophenol	2.6 J	2.6 J	µg/L	MW-14D-02	1 / 261	5-5.6	2.6	--	18	nc	NA	--	N	2,4
	218-01-9	Chrysene	0.092 J	1.7	µg/L	MW-06	4 / 262	0.1-0.11	1.7	--	2.9	ca	NA	--	N	2,4
	53-70-3	Dibenzo(a,h)anthracene	0.07 J	5.5	µg/L	MW-06	31 / 260	0.1 - 5	5.5	--	0.0029	ca	NA	--	Y	1
	120-83-2	2,4-Dichlorophenol	5.3	5.3	µg/L	MW-14D-02	1 / 262	5-5.6	5.3	--	11	nc	NA	--	N	2,4
	84-66-2	Diethylphthalate	1.7 J	41	µg/L	MW-06	2 / 262	5-5.6	41	--	2,900	nc	NA	--	N	2,4
	131-11-3	Dimethylphthalate	11	11	µg/L	MW-06	1 / 262	5-5.6	11	--	NA	nc	NA	--	N	4,5
	206-44-0	Fluoranthene	0.38	2.9	µg/L	MW-06	3 / 262	0.1-0.11	2.9	--	150	nc	NA	--	N	2,4
	86-73-7	Fluorene	0.033 J	0.56	µg/L	MW-14S-04	4 / 262	0.1-0.11	0.56	--	150	nc	NA	--	N	2,4
	193-39-5	Indeno(1,2,3-cd)pyrene	0.08	3.1 J	µg/L	MW-06	60 / 261	0.1 - 5	3.1	--	0.029	ca	NA	--	Y	1
	91-57-6	2-Methylnaphthalene	0.12	2.2	µg/L	MW-14S-04	6 / 262	0.1-0.11	2.2	--	15	nc	NA	--	N	2,4
	91-20-3	Naphthalene	0.03 J	14 J	µg/L	MW-14S-04	65 / 262	0.1 - 5	14	--	0.14	ca	300	NJDEP MCL	Y	1
	87-86-5	Pentachlorophenol	0.076 J	0.087 J	µg/L	ERT-6-03	2 / 200	0.2 - 10	0.09	--	0.17	ca	1	Federal MCL	N	2,4
	85-01-8	Phenanthrene	0.13	1.5	µg/L	MW-06	4 / 262	0.1-0.11	1.5	--	NA	nc	NA	--	N	4,5
	108-95-2	Phenol	1.8 J	4.3 J	µg/L	ERT-1-08	6 / 261	5-5.6	4.3	--	1,100	nc	NA	--	N	2,4
	129-00-0	Pyrene	0.085	2.3	µg/L	MW-06	6 / 262	0.1-0.11	2.3	--	110	nc	NA	--	N	2,4
	95-94-3	1,2,4,5-Tetrachlorobenzene	3.5 J	3.5 J	µg/L	MW-14S-04	1 / 262	5-5.6	3.5	--	1.1	nc	NA	--	N	1,4
	12674-11-2	Aroclor 1016	0.064 J	30	µg/L	MW-14S-02	16 / 262	0.01 - 90	30	--	0.26	nc	0.5	Federal MCL	Y	1
	12672-29-6	Aroclor 1248	0.12 NJ	7,300 J	µg/L	MW-14S-04	21 / 257	0.01 - 90	7,300	--	0.034	ca	0.5	Federal MCL	Y	1
	11097-69-1	Aroclor 1254	0.031 J	5,600 J	µg/L	MW-14S-04	69 / 260	0.01 - 90	5,600	3.8 J - 5.4 J	0.034	ca	0.5	Federal MCL	Y	1
	319-84-6	alpha-BHC	0.09 JN	68	µg/L	MW-14S-04	13 / 262	0.05 - 26	68	--	0.011	ca	NA	--	N	1,4
	319-85-7	beta-BHC	0.06 J	680 P	µg/L	MW-14S-04	7 / 262	0.05 - 26	680	0.087 J - 0.09 J	0.037	ca	NA	--	N	1,4
	319-86-8	delta-BHC	0.18 J	880 J	µg/L	MW-14S-04	5 / 210	0.05 - 26	880	--	NA	ca	NA	--	N	4,5
	58-89-9	gamma-BHC	0.065 P	14 JN	µg/L	MW-14S-04	6 / 262	0.05 - 26	14	--	0.061	ca	0.2	Federal MCL	N	1,4
	5103-74-2	gamma-Chlordane	0.029 J	370 J	µg/L	MW-14S-04	16 / 262	0.05 - 26	370	--	0.19	ca	0.5	NJDEP MCL	Y	1
	72-54-8	4,4'-DDD	0.09 NJ	1,800 NJ	µg/L	MW-14S-04	13 / 84	0.1 - 51	1,800	0.2 J - 0.25 J	0.28	ca	NA	--	Y	1
	72-55-9	4,4'-DDE	0.09 NJ	1,600 J	µg/L	MW-14S-04	17 / 259	0.1 - 51	1,600	--	0.20	ca	NA	--	Y	1
	50-29-3	4,4'-DDT	0.13	4,000 J	µg/L	MW-14S-04	24 / 258	0.1 - 51	4,000	0.41 - 0.53	0.20	ca	NA	--	Y	1
	60-57-1	Dieldrin	0.18 JN	350 JN	µg/L	MW-14S-04	7 / 258	0.1 - 51	350	0.22	0.0042	ca	NA	--	N	1,4
	33213-65-9	Endosulfan II	0.17 J	240 J	µg/L	MW-14S-04	7 / 262	0.1 - 51	240	--	NA	nc	NA	--	N	4,5
	1031-07-8	Endosulfan sulfate	0.078 J	75 JN	µg/L	MW-14S-04	7 / 262	0.1 - 51	75	--	NA	nc	NA	--	N	4,5
	72-20-8	Endrin	0.19 JN	0.19 JN	µg/L	MW-05	1 / 258	0.1 - 51	0.19	--	1.1	nc	2	Federal MCL	N	2,4
	7421-93-4	Endrin aldehyde	0.11 J	150 J	µg/L	MW-14S-04	6 / 262	0.1 - 51	150	--	NA	ca	NA	--	N	4,5
	76-44-8	Heptachlor	0.06	300	µg/L	MW-14S-04	16 / 262	0.05 - 26	300	--	0.015	ca	0.4	Federal MCL	Y	1
	1024-57-3	Heptachlor epoxide	2.6 NJ	2.6 NJ	µg/L	MW-12	1 / 262	0.05 - 26	2.6	--	0.0074	ca	0.2	Federal MCL	N	1,4
	72-43-5	Methoxychlor	0.03 J	400 JN	µg/L	MW-14S-04	6 / 262	0.5 - 260	400	--	18	nc	40	Federal MCL	N	1,4
	--	2,3,7,8-TCDD Toxic Equivalence (TEQ) ⁵	8.1E-10 J	2.2E-01	µg/L	MW-14S-04	42 / 45	N/A	2.2E-01	1.1E-09 - 2.6E-09	5.2E-07	ca	3E-05	Federal MCL	Y	1

TABLE 2.1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Within and Outside the Boundaries of the Former CDE Facility - Process or Tap Water	7429-90-5	Aluminum	12.1 J	6,210	µg/L	MW-10	79 / 252	200	6,210	84.8 J - 577	3,700	nc	NA	--	Y	1
	7440-36-0	Antimony	0.32 J	3.5	µg/L	MW-07	13 / 262	2 - 4	3.5	--	1.5	nc	6	Federal MCL	N	1,4
	7440-38-2	Arsenic	0.68 J	829	µg/L	FPW-01	262 / 262	1 - 2	N/A	0.45 J - 10.9	0.045	ca	5	NJDEP MCL	Y	1
	7440-39-3	Barium	8.7 J	8,790	µg/L	ERT-2-01	261 / 262	10 - 30	8,790	76.2 - 1,780 J	730	nc	2,000	Federal MCL	Y	1
	7440-41-7	Beryllium	0.13 J	0.45 J	µg/L	MW-13-01	4 / 262	1 - 4	0.45	0.069 J	7.3	nc	4	Federal MCL	N	2,4
	7440-43-9	Cadmium	0.04 J	16.8	µg/L	MW-04	23 / 262	1 - 2	17	0.19 J	1.8	nc	5	Federal MCL	Y	1
	7440-70-2	Calcium	29,500	597,000	µg/L	ERT-2-01	262 / 262	5,000 - 10,000	N/A	40,700 - 127,000	NA	nc	NA	--	N	3,5
	18540-29-9	Chromium	0.11 J	96.8	µg/L	MW-05	97 / 262	2 - 4	97	0.13 J - 0.75 J	0.043 ^a	ca	100	Federal MCL	Y	1
	7440-48-4	Cobalt	0.05 J	6.6	µg/L	MW-13-06	72 / 262	1 - 2	6.6	0.044 J - 0.49 J	1.1	nc	NA	--	Y	1
	7440-50-8	Copper	0.36 J	123	µg/L	MW-21-02	192 / 261	2 - 4	123	0.57 J - 3.5	150	nc	1,300	Federal MCL	N	2
	57-12-5	Cyanide	1 J	29.5	µg/L	MW-23-09	28 / 262	10	25	--	73 ^b	nc	200	Federal MCL	N	2
	7439-89-6	Iron	11 J	8,520	µg/L	MW-10	83 / 262	100-200	8,520	33.7 J - 500	2,600	nc	NA	--	Y	1
	7739-92-1	Lead	0.25 J	32.9	µg/L	MW-12	238 / 262	1 - 2	33	0.73 J - 3.7	15 ^c	al	5	NJDEP MCL	Y	1
	7439-95-4	Magnesium	1,160 J	135,000	µg/L	MW-19-06	262 / 262	5,000	N/A	9,170 - 22,300	NA	nc	NA	--	N	3,5
	7439-96-5	Manganese	0.18 J	2,020	µg/L	MW-21-08	245 / 262	1 - 2	2,020	0.32 J - 37.8 J	88	nc	NA	--	Y	1
	7487-94-7	Mercury	0.048 J	0.12 J	µg/L	ERT-2-01; ERT-2-02	12 / 253	0.2	0.12	0.079 J - 0.12 J	1.1 ^d	nc	2	Federal MCL	N	2,4
	7440-02-0	Nickel	0.19 J	18	µg/L	FPW-02	202 / 245	1 - 2	18	0.37 J - 2.1	73 ^e	nc	NA	--	N	2
	7440-9-7	Potassium	971 J	27,800	µg/L	MW-13-01	171 / 262	5,000	27,800	971 J - 2,210 J	NA	nc	NA	--	N	3,5
	7782-49-2	Selenium	0.16 J	2.2 J	µg/L	MW-22-02	42 / 262	5 - 10	2.2	0.3 J - 0.72 J	18	nc	50	Federal MCL	N	2
	7440-22-4	Silver	0.02 J	0.12 J	µg/L	MW-04	11 / 262	1 - 2	0.12	0.022 J	18	nc	NA	--	N	2,4
	7440-23-5	Sodium	8,450	691,000	µg/L	MW-20-01	262 / 262	5,000 - 8,000	N/A	8,980 - 15,000	NA	nc	50,000	NJDEP MCL	N	3,5
	7440-62-2	Vanadium	1.3 J	30	µg/L	MW-12	216 / 262	5 - 10	30	1.8 J - 8.8	18	nc	NA	--	Y	1
	7440-66-6	Zinc	2.5	187	µg/L	MW-12	262 / 262	2 - 4	N/A	6.4 J - 34.7 J	1,100	nc	NA	--	N	2

Notes

¹ Detection limits are equivalent to reporting limits.

² Background concentrations are groundwater data from the upgradient monitoring well, ERT-8

³ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

d = Screening toxicity value is for mercuric chloride and other mercury salts.

e = Screening toxicity value is for nickel soluble salts.

⁴ The potential ARAR/TBC value is the lower of the Safe Drinking Water Act Maximum Contaminant Levels (MCL) (40 CFR 141) and the New Jersey Drinking Water Quality Act MCL (NJAC 7:10-16).

⁵ 2,3,7,8-TCDD Toxic Equivalence (TEQ) represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

NA = Not Available

N/A = Not Applicable

Qualifier Codes:

J - indicates an estimated value

P - indicates the pesticide or Aroclor had a percent difference > 25% between the two gas chromatograph columns, and the lower of the two results is reported.

N - indicates presumptive evidence of a compound

Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5%

5 = No screening toxicity value available

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - SHALLOW ONSITE GROUNDWATER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Onsite Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Within the Boundaries of the Former CDE Facility - Top of the Groundwater Table	67-64-1	Acetone	0.82 J	24	µg/L	FPW-01	5 / 33	5 - 5,000	24	--	2,200	nc	NA	--	N	2
	71-43-2	Benzene	0.16 J	24	µg/L	MW-11	12 / 34	0.5 - 500	24	--	0.41	ca	1	NJDEP MCL	Y	1
	75-27-4	Bromodichloromethane	0.47 J	0.47 J	µg/L	MW-06	1 / 33	0.5 - 500	0.5	--	0.12	ca	80	Federal MCL	N	1,4
	75-25-2	Bromoform	0.62	2.9	µg/L	MW-03	3 / 34	0.5 - 500	2.9	--	8.5	ca	80	Federal MCL	N	2
	78-93-3	2-Butanone	5.5	5.5	µg/L	FPW-01	1 / 31	5 - 5,000	5.5	--	710	nc	NA	--	N	2,4
	108-90-7	Chlorobenzene	0.21 J	65	µg/L	MW-09	16 / 34	0.5 - 500	65	--	9.1	nc	50	NJDEP MCL	Y	1
	67-66-3	Chloroform	0.37 J	19	µg/L	MW-11	10 / 34	0.5 - 500	19	--	0.19	ca	80	NJDEP MCL	Y	1
	110-82-7	Cyclohexane	0.25 J	13	µg/L	MW-11	7 / 34	0.5 - 500	13	--	1,300	nc	NA	--	N	2
	96-12-8	1,2-Dibromo-3-chloropropane	0.039 J	0.39 J	µg/L	MW-11	7 / 34	0.05	0.39	--	0.00032	ca	0.2	Federal MCL	Y	1
	124-48-1	Dibromochloromethane	0.43 J	1.2	µg/L	MW-03	2 / 34	0.5 - 500	1.2	--	0.15	ca	80	Federal MCL	Y	1
	106-93-4	1,2-Dibromoethane	0.01 J	0.01 J	µg/L	MW-03	1 / 34	0.05 - 500	0.01	--	0.0065	ca	0.05	Federal MCL	N	1,4
	95-50-1	1,2-Dichlorobenzene	0.2 J	56	µg/L	MW-12	13 / 34	0.5 - 500	56	--	37	nc	600	Federal MCL	Y	1
	541-73-1	1,3-Dichlorobenzene	0.24 J	120	µg/L	MW-12	14 / 34	0.5 - 500	120	--	NA	ca	600	NJDEP MCL	Y	5
	106-46-7	1,4-Dichlorobenzene	0.43 J	110	µg/L	MW-12	14 / 34	0.5 - 500	110	--	0.43	ca	75	Federal MCL	Y	1
	75-34-3	1,1-Dichloroethane	0.55	11	µg/L	FPW-01	5 / 34	0.5 - 500	11	--	2.4	ca	50	NJDEP MCL	Y	1
	107-06-2	1,2-Dichloroethane	0.22 J	15	µg/L	MW-11	5 / 34	0.5 - 500	15	--	0.15	ca	2	NJDEP MCL	Y	1
	75-35-4	1,1-Dichloroethene	0.73	280 J	µg/L	MW-11	13 / 34	0.5 - 500	280	--	34	nc	2	NJDEP MCL	Y	1
	156-59-2	cis-1,2-Dichloroethene	0.96 J	390,000 J	µg/L	MW-11	32 / 34	0.5 - 500	390,000	--	7.3	nc	70	Federal MCL	Y	1
	156-60-5	trans-1,2-Dichloroethene	0.11 J	1,300 J	µg/L	MW-11	23 / 34	0.5 - 500	1,300	--	11	nc	100	Federal MCL	Y	1
	100-41-4	Ethylbenzene	0.62	20	µg/L	MW-11	2 / 34	0.5 - 500	20	--	1.5	ca	700	Federal MCL	Y	1
	98-82-8	Isopropylbenzene	0.2 J	5.1 J	µg/L	MW-11	2 / 34	0.5 - 500	5.1	--	68	nc	NA	--	N	2
	1634-04-4	Methyl tert-butyl ether	0.15 J	1.3	µg/L	MW-05	7 / 34	0.5 - 500	1.3	--	12	ca	70	NJDEP MCL	N	2
	108-87-2	Methylcyclohexane	0.89	42	µg/L	MW-11	6 / 33	0.5 - 500	42	--	NA	ca	NA	--	Y	5
	75-09-2	Methylene chloride	0.36 J	7 J	µg/L	MW-11	4 / 34	0.5 - 500	7.0	--	4.8	ca	3	NJDEP MCL	Y	1
	127-18-4	Tetrachloroethene	0.25 J	1,600	µg/L	MW-06	21 / 34	0.5 - 500	1,600	--	0.11	ca	1	NJDEP MCL	Y	1
	108-88-3	Toluene	0.13 J	52	µg/L	MW-16-01	11 / 34	0.5 - 500	52	--	230	nc	1,000	Federal MCL	N	2
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.2	2.2	µg/L	MW-01A	2 / 34	0.5 - 500	2.2	--	5,900	nc	NA	--	N	2
	87-61-6	1,2,3-Trichlorobenzene	0.58 J	280	µg/L	MW-12	16 / 34	0.5 - 500	280	--	2.9	nc	NA	--	Y	1
	120-82-1	1,2,4-Trichlorobenzene	0.4 J	1,600 J	µg/L	MW-12	21 / 34	0.5 - 500	1,600	--	0.41	nc	9	NJDEP MCL	Y	1
	71-55-6	1,1,1-Trichloroethane	0.32 J	0.32 J	µg/L	MW-01A	1 / 34	0.5 - 500	0.32	--	910	nc	30	NJDEP MCL	N	2,4
	79-00-5	1,1,2-Trichloroethane	0.49 J	120	µg/L	MW-11	10 / 34	0.5 - 500	120	--	0.24	ca	3	NJDEP MCL	Y	1
	79-01-6	Trichloroethene	0.53	170,000	µg/L	MW-11	34 / 34	N/A	170,000	--	2.0	ca	1	NJDEP MCL	Y	1
	1330-20-7	m,p-Xylene	0.57	12 J	µg/L	MW-11	2 / 34	0.5 - 500	12	--	20	nc	1,000	NJDEP MCL	N	2
	1330-20-7	o-Xylene	1.4	85	µg/L	MW-11	3 / 34	0.5 - 500	85	--	20	nc	1,000	NJDEP MCL	Y	1
	75-01-4	Vinyl chloride	0.5 J	860 J	µg/L	MW-11	22 / 34	0.5 - 500	860	--	0.016	ca	2	Federal MCL	Y	1
	83-32-9	Acenaphthene	0.26	0.39	µg/L	MW-02A	3 / 34	0.1	0.39	--	220	nc	NA	--	N	2
	120-12-7	Anthracene	0.49 J	0.49 J	µg/L	MW-06	1 / 34	0.1 - 5	0.49	--	1,100	nc	NA	--	N	2,4
	100-52-7	Benzaldehyde	7.2	7.2	µg/L	MW-14S-01	1 / 34	5	7.2	--	370	nc	NA	--	N	2,4
	56-55-3	Benzo(a)anthracene	0.18	1.7	µg/L	MW-06	2 / 34	0.1	1.7	--	0.029	ca	NA	--	Y	1
	50-32-8	Benzo(a)pyrene	0.14	2.5 J	µg/L	MW-06	3 / 34	0.1 - 5	2.5	--	0.0029	ca	2	Federal MCL	Y	1
	205-99-2	Benzo(b)fluoranthene	0.38	2.1 J	µg/L	MW-06	2 / 34	0.1 - 5	2.1	--	0.029	ca	NA	--	Y	1
	191-24-2	Benzo(g,h,i)perylene	0.17	2.4 J	µg/L	MW-06	3 / 34	0.1 - 5	2.4	--	NA	ca	NA	--	Y	5
	207-08-9	Benzo(k)fluoranthene	0.21	2 J	µg/L	MW-06	2 / 34	0.1 - 5	2.0	--	0.29	ca	NA	--	Y	1
	92-52-4	1,1'-Biphenyl	1.1 J	2.3 J	µg/L	MW-11	2 / 34	5	2.3	--	0.083	nc	NA	--	Y	1
	117-81-7	bis(2-Ethylhexyl)phthalate	3.7 J	4.4 J	µg/L	ERT-1-01	2 / 34	5	4.4	--	4.8	ca	6	Federal MCL	N	2
	105-60-2	Caprolactam	2.3 J	6.5	µg/L	MW-16-01	2 / 34	5	6.5	--	1,800	nc	NA	--	N	2
	86-74-8	Carbazole	0.54 J	0.54 J	µg/L	MW-06	1 / 34	5	0.54	--	NA	ca	NA	--	N	4,5
	218-01-9	Chrysene	0.21	1.7	µg/L	MW-06	2 / 34	0.1	1.7	--	2.9	ca	NA	--	N	2
	53-70-3	Dibenzo(a,h)anthracene	0.096 J	5.5	µg/L	MW-06	5 / 34	0.1	5.5	--	0.0029	ca	NA	--	Y	1
	84-66-2	Diethylphthalate	41	41	µg/L	MW-06	1 / 34	5	41	--	2,900	nc	NA	--	N	2,4
	131-11-3	Dimethylphthalate	11	11	µg/L	MW-06	1 / 34	5	11	--	NA	ca	NA	--	N	4,5
	206-44-0	Fluoranthene	0.38	2.9	µg/L	MW-06	2 / 34	0.1	2.9	--	150	nc	NA	--	N	2
	86-73-7	Fluorene	0.29	0.29	µg/L	MW-06	1 / 34	0.1	0.29	--	150	nc	NA	--	N	2,4
	193-39-5	Indeno(1,2,3-cd)pyrene	0.11	3.1 J	µg/L	MW-06	6 / 34	0.1 - 5	3.1	--	0.029	ca	NA	--	Y	1
	91-57-6	2-Methylnaphthalene	0.16	0.27	µg/L	MW-11	3 / 34	0.1	0.27	--	15	nc	NA	--	N	2
	91-20-3	Naphthalene	0.08	6.5	µg/L	MW-11	12 / 34	0.1 - 5	6.5	--	0.14	ca	300	NJDEP MCL	Y	1
	87-86-5	Pentachlorophenol	0.076 J	0.076 J	µg/L	MW-06	1 / 24	0.2 - 10	0.08	--	0.17	ca	1	Federal MCL	N	2,4
	85-01-8	Phenanthrene	0.13	1.5	µg/L	MW-06	2 / 34	0.1	1.5	--	NA	nc	NA	--	Y	5
	129-00-0	Pyrene	0.33	2.3	µg/L	MW-06	2 / 34	0.1	2.3	--	110	nc	NA	--	N	2
	12674-11-2	Aroclor 1016	0.28	14	µg/L	MW-14S-01	4 / 34	0.05 - 5	14	--	0.26	nc	0.5	Federal MCL	Y	1

TABLE 2.2
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - SHALLOW ONSITE GROUNDWATER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Onsite Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Within the Boundaries of the Former CDE Facility - Top of the Groundwater Table	12672-29-6	Aroclor 1248	1.4	40 J	µg/L	MW-14S-01	6 / 32	0.05 - 5	40	--	0.034	ca	0.5	Federal MCL	Y	1
	11097-69-1	Aroclor 1254	0.045 J	190 J	µg/L	MW-11	20 / 34	0.05 - 5	190	--	0.034	ca	0.5	Federal MCL	Y	1
	319-84-6	alpha-BHC	0.14	2.7	µg/L	MW-11	9 / 34	0.05 - 5	2.7	--	0.011	ca	NA	--	Y	1
	319-85-7	beta-BHC	0.97 J	0.97 J	µg/L	MW-14S-01	1 / 34	0.05 - 5	1.0	--	0.037	ca	NA	--	N	1,4
	319-86-8	delta-BHC	0.34 J	3.6 J	µg/L	MW-12	2 / 31	0.05 - 5	3.6	--	NA	ca	NA	--	Y	5
	58-89-9	gamma-BHC	0.065 P	1.3 J	µg/L	MW-12	4 / 34	0.05 - 5	1.3	--	0.061	ca	0.2	Federal MCL	Y	1
	5103-74-2	gamma-Chlordane	0.072	21 J	µg/L	MW-11	7 / 34	0.05 - 5	21	--	0.19	ca	0.5	NJDEP MCL	Y	1
	72-54-8	4,4'-DDD	0.09	2.2 JN	µg/L	MW-14S-01	6 / 15	0.1 - 0.11	2.2	--	0.28	ca	NA	--	Y	1
	72-55-9	4,4'-DDE	0.09	9.8	µg/L	MW-11	8 / 31	0.1 - 1	9.8	--	0.20	ca	NA	--	Y	1
	50-29-3	4,4'-DDT	0.13	36 JN	µg/L	MW-11	9 / 30	0.1 - 1	36	--	0.20	ca	NA	--	Y	1
	60-57-1	Dieldrin	0.19 J	3.1 JN	µg/L	MW-09	4 / 31	0.1 - 0.5	3.1	--	0.0042	ca	NA	--	Y	1
	33213-65-9	Endosulfan II	0.17 J	8.5	µg/L	MW-11	5 / 34	0.1 - 1	8.5	--	NA		NA	--	Y	5
	1031-07-8	Endosulfan sulfate	0.078 J	3.1 NJ	µg/L	MW-11	5 / 34	0.1 - 1	3.1	--	NA		NA	--	Y	5
	72-20-8	Endrin	0.19 JN	0.19 JN	µg/L	MW-05	1 / 32	0.1 - 1	0.19	--	1.1	nc	2	Federal MCL	N	2,4
	7421-93-4	Endrin aldehyde	0.11 J	5.7	µg/L	MW-11	4 / 34	0.1 - 1	5.7	--	NA		NA	--	Y	5
	76-44-8	Heptachlor	0.06	5.1	µg/L	MW-12	9 / 34	0.05 - 5	5.1	--	0.015	ca	0.4	Federal MCL	Y	1
	1024-57-3	Heptachlor epoxide	2.6 NJ	2.6 NJ	µg/L	MW-12	1 / 34	0.05 - 5	2.6	--	0.0074	ca	0.2	Federal MCL	N	1,4
	72-43-5	Methoxychlor	0.97 JN	11	µg/L	MW-09	2 / 34	0.5 - 5	11	--	18	nc	40	Federal MCL	N	2
	--	2,3,7,8-TCDD Toxic Equivalence (TEQ) ⁵	8.1E-10 J	8.4E-04	µg/L	MW-11	13 / 13	N/A	8.4E-04	NA	5.2E-07	ca	3E-05	Federal MCL	Y	1
	7429-90-5	Aluminum	71.3 J	6,210	µg/L	MW-10	26 / 34	200	6,210	125 J - 577	3,700	nc	NA	--	Y	1
	7440-36-0	Antimony	3.5	3.5	µg/L	MW-07	1 / 34	2	3.5	--	1.5	nc	6	Federal MCL	N	1,4
	7440-38-2	Arsenic	0.68 J	829	µg/L	FPW-01	34 / 34	N/A	829	0.7 J - 1.1	0.045	ca	5	NJDEP MCL	Y	1
	7440-39-3	Barium	70.6	2,650	µg/L	MW-11	34 / 34	N/A	2,650	899 - 1,250	730	nc	2,000	Federal MCL	Y	1
	7440-41-7	Beryllium	0.2 J	0.23 J	µg/L	MW-12	2 / 34	1	0.23	0.069 J	7.3	nc	4	Federal MCL	N	2
	7440-43-9	Cadmium	1	16.8	µg/L	MW-04	5 / 34	1	17	--	1.8	nc	5	Federal MCL	Y	1
	7440-70-2	Calcium	41,200	142,000	µg/L	MW-11	34 / 34	N/A	142,000	109,000	NA		NA	--	N	3,5
	18540-29-9	Chromium	0.34 J	96.8	µg/L	MW-05	21 / 34	2	97	0.68 J - 0.69 J	0.043 ^a	ca	100	Federal MCL	Y	1
	7440-48-4	Cobalt	0.17 J	3.5	µg/L	MW-06	14 / 34	1	3.5	--	1.1	nc	NA	--	Y	1
	7440-50-8	Copper	0.57 J	80.1	µg/L	MW-09	29 / 34	2	80	0.78 J - 2.1 J	150	nc	1,300	Federal MCL	N	2
	57-12-5	Cyanide	1.1 J	11.6 J	µg/L	MW-11	4 / 34	10	12	--	73 ^b	nc	200	Federal MCL	N	2
	7439-89-6	Iron	46.6 J	8,520	µg/L	MW-10	31 / 34	100	8,520	500	2,600	nc	NA	--	Y	1
	7739-92-1	Lead	0.25 J	33	µg/L	MW-12	22 / 34	1	33	1.4 - 2	15 ^c	al	5	NJDEP MCL	Y	1
	7439-95-4	Magnesium	6,960	24,300	µg/L	MW-09	34 / 34	N/A	24,300	9,170 - 9,620	NA		NA	--	N	3,5
	7439-96-5	Manganese	23.4	1,660	µg/L	MW-11	34 / 34	N/A	1,660	7.7 - 37.8 J	88	nc	NA	--	Y	1
	7487-94-7	Mercury	0.048 J	0.11 J	µg/L	MW-04	3 / 34	0.2	0.11	0.12 J	1.1 ^d	nc	2	Federal MCL	N	2
	7440-02-0	Nickel	0.32 J	13.5	µg/L	MW-05	32 / 32	1	14	--	73 ^e	nc	NA	--	N	2
	7440-9-7	Potassium	1,390 J	9,450	µg/L	MW-07	24 / 34	5,000	9,450	1,430 J	NA		NA	--	N	3,5
	7782-49-2	Selenium	0.19 J	0.37 J	µg/L	ERT-1-01	2 / 34	5	0.37	0.3 J	18	nc	50	Federal MCL	N	2
	7440-22-4	Silver	0.02 J	0.11 J	µg/L	MW-04	7 / 34	1	0.11	--	18	nc	NA	--	N	2
	7440-23-5	Sodium	10,900	59,800	µg/L	MW-02A	34 / 34	N/A	59,800	14,400 - 15,000	NA		50,000	NJDEP MCL	N	3,5
	7440-62-2	Vanadium	1.3 J	30	µg/L	MW-12	21 / 34	5	30	3.4 J	18	nc	NA	--	Y	1
	7440-66-6	Zinc	2.5	187	µg/L	MW-12	34 / 34	N/A	187	8.6 J - 15.4 J	1,100	nc	NA	--	N	2

Notes

¹ Detection limits are equivalent to reporting limits.

² Background concentrations are groundwater data from the upgradient monitoring well, ERT-8.

³ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

d = Screening toxicity value is for mercuric chloride and other mercury salts.

e = Screening toxicity value is for nickel soluble salts.

⁴ The potential ARAR/TBC value is the lower of the Safe Drinking Water Act Maximum Contaminant Levels (MCL) (40 CFR 141) and the New Jersey Drinking Water Quality Act MCL (NJAC 7:10-16).

⁵ 2,3,7,8-TCDD Toxic Equivalence (TEQ) represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

NA = Not Available

N/A = Not Applicable

Qualifier Codes:

J - indicates an estimated value

P - indicates the pesticide or Aroclor had a percent difference > 25% between the two gas chromatograph columns, and the lower of the two results is reported.

N - indicates presumptive evidence of a compound

Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5%

5 = No screening toxicity value available

TABLE 2.3
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - SHALLOW OFFSITE GROUNDWATER, SOUTH OF BOUND BROOK
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Offsite, South Bound Brook Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Outside the Boundaries of the Former CDE Facility - Top of the Groundwater Table	71-43-2	Benzene	0.5	0.5	µg/L	ERT-2-01	1 / 8	0.5 - 10	1	--	0.41	ca	1	NJDEP MCL	Y	1
	75-25-2	Bromoform	0.59	1.8	µg/L	ERT-5-01	2 / 8	0.5 - 10	1.8	--	8.5	ca	80	Federal MCL	N	2
	67-66-3	Chloroform	1.1	1.1	µg/L	ERT-7-01	1 / 8	0.5 - 10	1	--	0.19	ca	80	Federal MCL	Y	1
	124-48-1	Dibromochloromethane	0.51	0.51	µg/L	ERT-5-01	1 / 8	0.5 - 10	0.5	--	0.15	ca	80	Federal MCL	Y	1
	156-59-2	cis-1,2-Dichloroethene	0.36 J	31	µg/L	ERT-2-01	4 / 8	0.5 - 10	31	--	7.3	nc	70	Federal MCL	Y	1
	1634-04-4	Methyl tert-butyl ether	0.54	330	µg/L	ERT-2-01	4 / 8	0.5 - 10	330	--	12	ca	70	NJDEP MCL	Y	1
	127-18-4	Tetrachloroethene	1.9	1.9	µg/L	ERT-2-01	1 / 8	0.5 - 10	2	--	0.11	ca	1	NJDEP MCL	Y	1
	108-88-3	Toluene	0.32 J	0.52	µg/L	ERT-7-01	3 / 8	0.5 - 10	1	--	230	nc	1,000	Federal MCL	N	2
	79-01-6	Trichloroethene	620	1,800	µg/L	ERT-2-01	2 / 8	0.5 - 10	1,800	--	2.0	ca	1	NJDEP MCL	Y	1
	117-81-7	bis(2-Ethylhexyl)phthalate	1.2 J	2.5 J	µg/L	ERT-2-01	2 / 8	5	3	--	4.8	ca	6	Federal MCL	N	2
	105-60-2	Caprolactam	2.3 J	2.3 J	µg/L	ERT-6-01	1 / 8	5	2	--	1,800	nc	NA	--	N	2
	53-70-3	Dibenzo(a,h)anthracene	2.4 J	2.4 J	µg/L	ERT-7-01	1 / 8	0.1 - 5	2.4	--	0.0029	ca	NA	--	Y	1
	193-39-5	Indeno(1,2,3-cd)pyrene	0.11 J	0.11 J	µg/L	ERT-5-01	1 / 8	0.1	0.1	--	0.029	ca	NA	--	Y	1
	91-20-3	Naphthalene	0.084 J	0.18	µg/L	ERT-7-01	2 / 8	0.1	0	--	0.14	ca	300	NJDEP MCL	Y	1
	12672-29-6	Aroclor 1248	2 JN	2 JN	µg/L	ERT-2-01	1 / 8	0.05 - 0.09	2	--	0.034	ca	0.5	Federal MCL	Y	1
	11097-69-1	Aroclor 1254	3.1 J	3.1 J	µg/L	ERT-2-01	1 / 8	0.05 - 0.09	3	--	0.034	ca	0.5	Federal MCL	Y	1
	--	2,3,7,8-TCDD Toxic Equivalence (TEQ) ⁵	1.5E-07	1.7E-06	µg/L	ERT-2-01	2 / 2	N/A	1.7E-06	NA	5.2E-07	ca	3E-05	Federal MCL	Y	1
	7429-90-5	Aluminum	100 J	369	µg/L	ERT-2-01	4 / 8	200	369	125 J - 577	3,700	nc	NA	--	N	2
	7440-38-2	Arsenic	0.85 J	68.8	µg/L	ERT-7-01	8 / 8	N/A	69	0.7 J - 1.1	0.045	ca	5	NJDEP MCL	Y	1
	7440-39-3	Barium	158	8,790	µg/L	ERT-2-01	8 / 8	N/A	8,790	899 - 1,250	730	nc	2,000	Federal MCL	Y	1
	7440-70-2	Calcium	49,250	597,000	µg/L	ERT-2-01	8 / 8	N/A	597,000	109,000	NA		NA	--	N	3,5
	18540-29-9	Chromium	0.45 J	0.57 J	µg/L	ERT-6-01	2 / 8	2 - 4	1	0.68 J - 0.69 J	0.043 ^a	ca	100	Federal MCL	Y	1
	7440-48-4	Cobalt	0.25 J	0.41 J	µg/L	ERT-2-01	2 / 8	1 - 2	0.4	--	1.1	nc	NA	--	N	2
	7440-50-8	Copper	0.72 J	2.8	µg/L	ERT-7-01	2 / 8	2 - 4	3	0.78 J - 2.1 J	150	nc	1,300	Federal MCL	N	2
	7439-89-6	Iron	86.9 J	1,870	µg/L	ERT-6-01	6 / 8	100	1,870	500	2,600	nc	NA	--	N	2
	7739-92-1	Lead	0.26 J	2.8	µg/L	ERT-7-01	5 / 8	1 - 2	3	1.4 - 2	15 ^b	al	5	NJDEP MCL	N	2
	7439-95-4	Magnesium	5,130	48,900	µg/L	ERT-2-01	8 / 8	N/A	48,900	9,170 - 9,620	NA		NA	--	N	3,5
	7439-96-5	Manganese	34.9	484	µg/L	ERT-6-01	8 / 8	N/A	484	7.7 - 37.8 J	88	nc	NA	--	Y	1
	7487-94-7	Mercury	0.12 J	0.12 J	µg/L	ERT-2-01	1 / 8	0.2	0.12	0.12 J	1.1 ^c	nc	2	Federal MCL	N	2
	7440-02-0	Nickel	0.85 J	11 J	µg/L	ERT-2-01	5 / 8	1 - 2	11	--	73 ^d	nc	NA	--	N	2
	7440-9-7	Potassium	1,340 J	5,740 J	µg/L	ERT-2-01	5 / 8	5,000	5,740	1,430 J	NA		NA	--	N	3,5
	7782-49-2	Selenium	0.97 J	0.97 J	µg/L	ERT-2-01	1 / 8	5 - 10	1.0	0.3 J	18	nc	50	Federal MCL	N	2
	7440-23-5	Sodium	10,000	47,000	µg/L	ERT-2-01	8 / 8	N/A	47,000	14,400 - 15,000	NA		50,000	NJDEP MCL	N	3,5
	7440-62-2	Vanadium	1.4 J	3.4 J	µg/L	ERT-6-01	4 / 8	5 - 10	3	3.4 J	18	nc	NA	--	N	2
	7440-66-6	Zinc	5 J	20.1	µg/L	ERT-7-01	8 / 8	N/A	20	8.6 J - 15.4 J	1,100	nc	NA	--	N	2

Notes

¹ Detection limits are equivalent to reporting limits

² Background concentrations are groundwater data from the upgradient monitoring well, ERT-8

³ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

c = Screening toxicity value is for mercuric chloride and other mercury salts.

d = Screening toxicity value is for nickel soluble salts.

⁴ The potential ARAR/TBC value is the lower of the Safe Drinking Water Act Maximum Contaminant Levels (MCL) (40 CFR 141) and the New Jersey Drinking Water Quality Act MCL (NJAC 7:10-16).

⁵ 2,3,7,8-TCDD Toxic Equivalence (TEQ) represents the sum of dioxin/furan TEQ and PCB congeners TEQ

NA = Not Available

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5%

5 = No screening toxicity value available

TABLE 2.4
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - SHALLOW OFFSITE GROUNDWATER, NORTH OF BOUND BROOK
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Offsite, North Bound Brook Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits ¹	Concentration Used for Screening	Background Value ²	Screening Toxicity Value ³	Basis	Potential ARAR/TBC Value ⁴	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Outside the Boundaries of the Former CDE Facility - Top of the Groundwater Table	67-64-1	Acetone	2.3 J	230	µg/L	MW-20-01	9 / 16	5 - 25	230	--	2,200	nc	NA	--	N	2
	71-43-2	Benzene	0.21 J	1.8	µg/L	MW-20-01	2 / 16	0.5 - 2.5	1.8	--	0.41	ca	1	NJDEP MCL	Y	1
	75-27-4	Bromodichloromethane	0.25 J	0.7	µg/L	MW-19-01	2 / 16	0.5 - 2.5	0.7	--	0.12	ca	80	Federal MCL	Y	1
	67-66-3	Chloroform	0.68	3	µg/L	MW-13-01	5 / 16	0.5 - 2.5	3	--	0.19	ca	80	Federal MCL	Y	1
	75-34-3	1,1-Dichloroethane	0.16 J	0.28 J	µg/L	MW-13-01	2 / 16	0.5 - 2.5	0.28	--	2.4	ca	50	NJDEP MCL	N	2
	75-35-4	1,1-Dichloroethene	0.53	2.2	µg/L	MW-19-01	4 / 16	0.5 - 2.5	2.2	--	34	nc	2	NJDEP MCL	N	2
	156-59-2	cis-1,2-Dichloroethene	0.32 J	110	µg/L	MW-20-01	12 / 16	0.5 - 2.5	110	--	7.3	nc	70	Federal MCL	Y	1
	1634-04-4	Methyl tert-butyl ether	0.1 J	4.4 J	µg/L	MW-20-01	7 / 16	0.5 - 2.5	4.4	--	12	ca	70	NJDEP MCL	N	2
	75-09-2	Methylene chloride	0.28 J	3.3 J	µg/L	MW-13-01	2 / 16	0.5 - 2.5	3.3	--	4.8	ca	3	NJDEP MCL	N	2
	127-18-4	Tetrachloroethene	0.19 J	0.81	µg/L	ERT-4-01	3 / 16	0.5 - 2.5	0.81	--	0.11	ca	1	NJDEP MCL	Y	1
	108-88-3	Toluene	0.25 J	27	µg/L	MW-13-01	9 / 16	0.5 - 2.5	27	0.66 - 33E	230	nc	1,000	Federal MCL	N	2
	71-55-6	1,1,1-Trichloroethane	0.27 J	0.41 J	µg/L	MW-19-01	2 / 16	0.5 - 2.5	0.4	--	910	nc	30	NJDEP MCL	N	2
	79-01-6	Trichloroethene	0.43 J	310	µg/L	ERT-4-01	14 / 16	0.5 - 2.5	310	0.29 J - 0.54	2.0	ca	1	NJDEP MCL	Y	1
	75-01-4	Vinyl chloride	0.36 J	0.36 J	µg/L	MW-13-01	1 / 16	0.5 - 2.5	0.36	--	0.016	ca	2	Federal MCL	Y	1
	191-24-2	Benzo(g,h,i)perylene	0.098 J	0.098 J	µg/L	MW-19-01	1 / 16	0.1	0.098	--	NA	ca	NA	--	Y	5
	117-81-7	bis(2-Ethylhexyl)phthalate	5.2	5.2	µg/L	ERT-4-01	1 / 16	5	5.2	3.2 J - 6.8	4.8	ca	6	Federal MCL	Y	1
	105-60-2	Caprolactam	2.5 J	30	µg/L	MW-23-01	3 / 16	5	30	--	1,800	nc	NA	--	N	2
	193-39-5	Indeno(1,2,3-cd)pyrene	0.11 J	0.15	µg/L	MW-20-01	3 / 16	0.1	0.15	--	0.029	ca	NA	--	Y	1
	91-20-3	Naphthalene	0.1	0.16	µg/L	MW-13-01	2 / 16	0.1	0.16	--	0.14	ca	300	NJDEP MCL	Y	1
	12672-29-6	Aroclor 1248	0.45 J	1.2	µg/L	MW-20-01	2 / 16	0.01 - 0.1	1.2	--	0.034	ca	0.5	Federal MCL	Y	1
	11097-69-1	Aroclor 1254	0.038 J	1 J	µg/L	MW-20-01	2 / 15	0.01 - 0.1	1	3.8 J - 5.4 J	0.034	ca	0.5	Federal MCL	Y	1
	319-85-7	beta-BHC	0.35	0.35	µg/L	MW-20-01	1 / 16	0.05 - 0.056	0.35	0.087 J - 0.09 J	0.037	ca	NA	--	Y	1
	319-86-8	delta-BHC	0.42	0.42	µg/L	MW-20-01	1 / 14	0.05 - 0.056	0.42	--	NA	ca	NA	--	Y	5
	72-54-8	4,4'-DDD	0.11 JN	0.76 NJ	µg/L	MW-20-01	2 / 6	0.1 - 0.11	0.76	0.2 J - 0.25 J	0.28	ca	NA	--	Y	1
	72-55-9	4,4'-DDE	0.75 J	0.75 J	µg/L	MW-20-01	1 / 16	0.1 - 0.11	0.75	--	0.20	ca	NA	--	Y	1
	50-29-3	4,4'-DDT	0.16	1.5 J	µg/L	MW-20-01	2 / 16	0.1 - 0.11	1.5	0.41 - 0.53	0.20	ca	NA	--	Y	1
	5103-74-2	gamma-Chlordane	0.03 J	0.03 J	µg/L	MW-23-01	1 / 16	0.05 - 0.056	0.03	--	0.19	ca	0.5	NJDEP MCL	N	2
	76-44-8	Heptachlor	0.2	0.2	µg/L	MW-20-01	1 / 16	0.05 - 0.056	0.2	--	0.015	ca	0.4	Federal MCL	Y	1
	--	2,3,7,8-TCDD Toxic Equivalence (TEQ) ⁵	4.0E-08	4.0E-08	µg/L	MW22-01	1 / 2	N/A	4.0E-08	NA	5.2E-07	ca	3E-05	Federal MCL	N	2
	7429-90-5	Aluminum	28.3 J	1,820	µg/L	MW-13-01	5 / 15	200	1,820	84.8 J - 577	3,700	nc	NA	--	N	2
	7440-36-0	Antimony	0.51 J	2.2	µg/L	MW-13-01	2 / 16	2	2.2	--	1.5	nc	6	Federal MCL	Y	1
	7440-38-2	Arsenic	0.75 J	180	µg/L	MW-20-01	16 / 16	N/A	180	0.45 J - 10.9	0.045	ca	5	NJDEP MCL	Y	1
	7440-39-3	Barium	24.3	556	µg/L	MW-20-01	16 / 16	N/A	556	76.2 - 1,780 J	730	nc	2,000	Federal MCL	N	2
	7440-41-7	Beryllium	0.45 J	0.45 J	µg/L	MW-13-01	1 / 16	1	0.45	0.069 J	7.3	nc	4	Federal MCL	N	2
	7440-43-9	Cadmium	0.04 J	0.3 J	µg/L	MW-13-01	5 / 16	1	0.3	0.19 J	1.8	nc	5	Federal MCL	N	2
	7440-70-2	Calcium	29,500	194,000	µg/L	ERT-3-01	16 / 16	N/A	194,000	40,700 - 127,000	NA	ca	NA	--	N	3.5
	18540-29-9	Chromium	0.11 J	3.5	µg/L	MW-13-01	7 / 16	2	3.5	0.13 J - 0.75 J	0.043 ^a	ca	100	Federal MCL	Y	1
	7440-48-4	Cobalt	0.13 J	1.4	µg/L	MW-13-01	6 / 16	1	1.4	0.044 J - 0.49 J	1.1	nc	NA	--	Y	1
	7440-50-8	Copper	0.58 J	69.9	µg/L	MW-21-01	14 / 16	2	70	0.57 J - 3.5	150	nc	1,300	Federal MCL	N	2
	57-12-5	Cyanide	1 J	19.9	µg/L	MW-23-01	4 / 16	10	3.8	--	73 ^b	nc	200	Federal MCL	N	2
	7439-89-6	Iron	14.8 J	1,220	µg/L	MW-13-01	11 / 16	100	1,220	33.7 J - 500	2,600	nc	NA	--	N	2
	7739-92-1	Lead	0.42 J	20.9	µg/L	MW-21-01	15 / 16	1	21	0.73 J - 3.7	15 ^c	ai	5	NJDEP MCL	Y	1
	7439-95-4	Magnesium	1,160 J	46,100	µg/L	MW-19-01	16 / 16	N/A	46,100	9,170 - 22,300	NA	ca	NA	--	N	3.5
	7439-96-5	Manganese	1.2	1,580 J	µg/L	MW-20-01	16 / 16	N/A	1,580	0.32 J - 37.8 J	88	nc	NA	--	Y	1
	7440-02-0	Nickel	0.35 J	5 J	µg/L	MW-20-01	14 / 16	1	5.0	0.37 J - 2.1	73 ^d	nc	NA	--	N	2
	7440-9-7	Potassium	1,390 J	27,800	µg/L	MW-13-01	16 / 16	N/A	27,800	971 J - 2,210 J	NA	ca	NA	--	N	3.5
	7782-49-2	Selenium	0.68 J	1.7 J	µg/L	ERT-4-01	4 / 16	5	1.7	0.3 J - 0.72 J	18	nc	50	Federal MCL	N	2
	7440-23-5	Sodium	10,300	691,000	µg/L	MW-20-01	16 / 16	N/A	691,000	8,980 - 15,000	NA	ca	50,000	NJDEP MCL	N	3.5
	7440-62-2	Vanadium	1.4 J	20.5	µg/L	MW-13-01	13 / 16	5	20.5	1.8 J - 8.8	18	nc	NA	--	Y	1
	7440-66-6	Zinc	5.2	74.3	µg/L	MW-21-01	16 / 16	N/A	74.3	6.4 J - 34.7 J	1,100	nc	NA	--	N	2

Notes

¹ Detection limits are equivalent to reporting limits.

² Background concentrations are groundwater data from the upgradient monitoring well, ERT-8

³ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

d = Screening toxicity value is for nickel soluble salts.

⁴ The potential ARAR/TBC value is the lower of the Safe Drinking Water Act Maximum Contaminant Levels (MCL) (40 CFR 141) and the New Jersey Drinking Water Quality Act MCL (NJAC 7:10-16).

⁵ 2,3,7,8-TCDD Toxic Equivalence (TEQ) represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

NA = Not Available

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5%

5 = No screening toxicity value available

TABLE 3.1

EXPOSURE POINT CONCENTRATION SUMMARY - ENTIRE AQUIFER
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean ¹	95% UCL Concentration ² (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Within and Outside the Boundaries of the Former CDE Facility - Process or Tap Water	Benzene	µg/L	1.8	0.72 (NP)	24	0.72	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Bromodichloromethane	µg/L	0.54	0.41 (NP)	1.7	0.41	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Chlorobenzene	µg/L	11	3.7 (NP)	65	3.7	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Chloroform	µg/L	3.3	2.8 (NP)	150 J	2.8	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Dibromochloromethane	µg/L	0.41	0.34 (NP)	1.2	0.34	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2-Dichlorobenzene	µg/L	6.8	2.1 (NP)	56	2.1	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,3-Dichlorobenzene	µg/L	11	5.2 (NP)	120	5.2	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,4-Dichlorobenzene	µg/L	14	5.0 (NP)	110	5.0	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1-Dichloroethane	µg/L	1.1	0.70 (NP)	26 J	0.70	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2-Dichloroethane	µg/L	1.2	0.56 (NP)	15	0.56	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1-Dichloroethene	µg/L	8.5	5.7 (NP)	280 J	5.7	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	cis-1,2-Dichloroethene	µg/L	4,407	14,139 (NP)	390,000 J	14,139	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	trans-1,2-Dichloroethene	µg/L	52	61 (NP)	1,300 J	61	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Methyl tert-butyl ether	µg/L	10	13 (NP)	330	13	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Methylene chloride	µg/L	1.3	0.50 (NP)	7 J	0.50	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Tetrachloroethene	µg/L	20	36 (NP)	1,600	36	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2,3-Trichlorobenzene	µg/L	19	8.5 (NP)	280	8.5	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2,4-Trichlorobenzene	µg/L	89	58 (NP)	1,600 J	58	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1,2-Trichloroethane	µg/L	10	3.9 (NP)	120	3.9	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Trichloroethene	µg/L	2,444	7,041 (NP)	170,000	7,041	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Vinyl chloride	µg/L	74	53 (NP)	860 J	53	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	bis(2-Ethylhexyl)phthalate	µg/L	14	5.7 (NP)	26	5.7	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Dibenzo(a,h)anthracene	µg/L	0.38	0.17 (NP)	5.5	0.17	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Indeno(1,2,3-cd)pyrene	µg/L	0.24	0.14 (NP)	3.1 J	0.14	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Naphthalene	µg/L	0.64	0.34 (NP)	14 J	0.34	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Total PCB Aroclors	µg/L	5.1	4.4 (NP)	81	4.4	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	gamma-Chlordane	µg/L	26	11 (NP)	370 J	11	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDD	µg/L	139	160 (NP)	1,800 NJ	160	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDE	µg/L	111	48 (NP)	1,600 J	48	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDT	µg/L	205	120 (NP)	4,000 J	120	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Heptachlor	µg/L	27	9.7 (NP)	300	9.7	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	µg/L	5.5E-06	2.6E-05 (NP)	5.4E-05	2.6E-05	µg/L	99% Chebyshev (Mean, Sd) UCL	Potential UCL to use from ProUCL v4.1.00
	Aluminum	µg/L	437	268 (NP)	6,210	268	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Arsenic	µg/L	48	76 (NP)	829	76	µg/L	95% Chebyshev (Mean, Sd) UCL	Potential UCL to use from ProUCL v4.1.00
	Barium	µg/L	325	544 (NP)	8,790	544	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Cadmium	µg/L	1.3	0.56 (NP)	16.8	0.56	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Chromium	µg/L	2.8	2.3 (NP)	96.8	2.3	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Cobalt	µg/L	0.56	0.42 (NP)	6.6	0.42	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Iron	µg/L	751	538 (NP)	8,520	538	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Lead	µg/L	2.6	N/A	32.9	2.6	µg/L	Arithmetic average concentration, including 1/2 reporting limits for non-detected values	Per USEPA ALM and IEUBK Model for Lead in Children guidance
	Manganese	µg/L	206	319 (NP)	2,020	319	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Vanadium	µg/L	7.8	7.4 (NP)	30	7.4	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00

Notes

¹ The arithmetic mean of detected concentrations only is presented² The 95% Upper Confidence Level (UCL) on the arithmetic average concentration (i.e., the 95% UCL concentration) was calculated using ProUCL version 4.1.0X³ Represents the sum of dioxin/furan TEQ and PCB congeners TEQ. 95% UCL concentration was calculated using detected concentrations only.

N/A = Not Applicable

Data Distribution Codes:

NP = Nonparametric; data follow no discernible distribution

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY - SHALLOW ONSITE GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Onsite Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean ¹	95% UCL Concentration ² (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Within the Boundaries of the Former CDE Facility - Excavation	Benzene	µg/L	2.7	3.0 (NP)	24	3.0	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Chlorobenzene	µg/L	19	17 (NP)	65	17	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Chloroform	µg/L	3.5	2.8 (NP)	19	2.8	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2-Dibromo-3-chloropropane	µg/L	0.13	0.08 (NP)	0.39 J	0.08	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Dibromochloromethane	µg/L	0.82	0.55 (NP)	1.2	0.55	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2-Dichlorobenzene	µg/L	7.9	7.2 (NP)	56	7.2	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,3-Dichlorobenzene	µg/L	14	14 (NP)	120	14	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,4-Dichlorobenzene	µg/L	23	19 (NP)	110	19	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1-Dichloroethane	µg/L	3.1	2.9 (NP)	11	2.9	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2-Dichloroethane	µg/L	3.3	4.6 (NP)	15	4.6	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1-Dichloroethene	µg/L	28	68 (NP)	280 J	68	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	cis-1,2-Dichloroethene	µg/L	21,780	139,569 (NP)	390,000 J	139,569	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	trans-1,2-Dichloroethene	µg/L	137	581 (NP)	1,300 J	581	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Ethylbenzene	µg/L	10	11 (NP)	20	11	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Methylcyclohexane	µg/L	11	5.9 (NP)	42	5.9	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Methylene chloride	µg/L	2.1	7 (NP)	7 J	7	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Tetrachloroethene	µg/L	98	535 (NP)	1,600	535	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2,3-Trichlorobenzene	µg/L	30	74 (NP)	280	74	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,2,4-Trichlorobenzene	µg/L	144	179 (NP)	1,600 J	179	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1,2-Trichloroethane	µg/L	18	14 (NP)	120	14	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Trichloroethene	µg/L	11,107	23,103 (G)	170,000	23,103	µg/L	95% Adjusted Gamma UCL	Potential UCL to use from ProUCL v4.1.00
	o-Xylene	µg/L	29	38 (NP)	85	38	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Vinyl chloride	µg/L	139	158 (NP)	860 J	158	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Benzo(a)anthracene	µg/L	0.94	0.61 (NP)	1.7	0.61	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Benzo(a)pyrene	µg/L	0.95	0.35 (NP)	2.5 J	0.35	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Benzo(b)fluoranthene	µg/L	1.2	N/A	2.1 J	2.1	µg/L	Maximum detected	ProUCL output indicates N/A (number of detected data is not adequate enough)
	Benzo(g,h,i)perylene	µg/L	0.95	0.37 (NP)	2.4 J	0.37	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Benzo(k)fluoranthene	µg/L	1.1	0.72 (NP)	2 J	0.72	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	1,1-Biphenyl	µg/L	1.7	2.7 (NP)	2.3 J	2.7	µg/L	Maximum detected	Recommended UCL exceeds maximum detected concentration
	Dibenzo(a,h)anthracene	µg/L	1.2	1.4 (NP)	5.5	1.4	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Indeno(1,2,3-cd)pyrene	µg/L	0.64	0.38 (NP)	3.1 J	0.38	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Naphthalene	µg/L	1.3	2.0 (NP)	6.5	2.0	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Phenanthrene	µg/L	0.82	0.52 (NP)	1.5	0.52	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00

TABLE 3.2

EXPOSURE POINT CONCENTRATION SUMMARY - SHALLOW ONSITE GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Onsite Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean ¹	95% UCL Concentration ² (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Within the Boundaries of the Former CDE Facility - Excavation	Total PCB Aroclors	µg/L	10	12 (NP)	81	12	µg/L	95% UCL concentration	95% KM (BCA) UCL
	alpha-BHC	µg/L	0.75	0.49 (NP)	2.7	0.49	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	delta-BHC	µg/L	2.0	1.4 (NP)	3.6 J	1.4	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	gamma-BHC	µg/L	0.58	0.20 (NP)	1.3 J	0.20	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	gamma-Chlordane	µg/L	4.5	2.2 (NP)	21 J	2.2	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDD	µg/L	0.67	0.59 (NP)	2.2 JN	0.59	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDE	µg/L	2.5	1.3 (NP)	9.8	1.3	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	4,4'-DDT	µg/L	6.8	4.4 (NP)	36 JN	4.4	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Dieldrin	µg/L	0.96	0.47 (NP)	3.1 JN	0.47	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Endosulfan II	µg/L	3.1	1.1 (NP)	8.5	1.1	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Endosulfan sulfate	µg/L	1.2	0.45 (NP)	3.1 NJ	0.45	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Endrin aldehyde	µg/L	2.5	0.77 (NP)	5.7	0.77	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Heptachlor	µg/L	1.7	0.87 (NP)	5.1	0.87	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	µg/L	1.8E-05	7.1E-05 (NP)	5.4E-05	5.4E-05	µg/L	Maximum detected	Recommended UCL exceeds maximum detected concentration
	Aluminum	µg/L	755	1,842 (NP)	6,210	1,842	µg/L	95% UCL concentration	97.5% KM (Chebyshev) UCL
	Arsenic	µg/L	34	140 (NP)	829	140	µg/L	95% UCL concentration	95% KM Chebyshev (Mean, Sd) UCL
	Barium	µg/L	615	819 (G)	2,650	819	µg/L	95% UCL concentration	95% Approximate Gamma UCL
	Cadmium	µg/L	4.2	3.3 (NP)	17	3.3	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00
	Chromium	µg/L	10	29 (NP)	97	29	µg/L	95% UCL concentration	97.5% KM (Chebyshev) UCL
	Cobalt	µg/L	1.0	0.93 (NP)	3.5	0.93	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Iron	µg/L	1,306	2,731 (NP)	8,520	2,731	µg/L	95% UCL concentration	95% KM (Chebyshev) UCL
	Lead	µg/L	4.1	N/A	33	3.0	µg/L	Arithmetic average concentration, including 1/2 reporting limits for non detected values	Per USEPA ALM and IEUBK Model for Lead in Children guidance
	Manganese	µg/L	467	665 (G)	1,660	665	µg/L	95% Approximate Gamma UCL	Potential UCL to use from ProUCL v4.1.00
	Vanadium	µg/L	7.7	7.8 (NP)	30	7.8	µg/L	95% UCL concentration	95% KM (Percentile Bootstrap) UCL

Notes¹ The arithmetic mean of detected concentrations only is presented.² The 95% Upper Confidence Level (UCL) on the arithmetic average concentration (i.e., the 95% UCL concentration) was calculated using ProUCL version 4.1.00.³ Represents the sum of dioxin/furan TEQ and PCB congeners TEQ. 95% UCL concentration was calculated using detected concentrations only.

N/A = Not Applicable

Data Distribution Codes:

G = Gamma or Approximate Gamma

NP = Nonparametric; data follow no discernible distribution

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

TABLE 3.3

EXPOSURE POINT CONCENTRATION SUMMARY - SHALLOW OFFSITE GROUNDWATER, SOUTH OF BOUND BROOK
 REASONABLE MAXIMUM EXPOSURE
 CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
 SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Shallow Offsite Groundwater, South of Bound Brook

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean ¹	95% UCL Concentration ² (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside the Boundaries of the Former CDE Facility - Excavation	Benzene	µg/L	N/A	N/A	0.5	0.5	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Chloroform	µg/L	N/A	N/A	1.1	1.1	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Dibromochloromethane	µg/L	N/A	N/A	0.51	0.51	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	cis-1,2-Dichloroethene	µg/L	15	17 (NP)	31	17	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Methyl tert-butyl ether	µg/L	163	190 (NP)	330	190	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Tetrachloroethene	µg/L	N/A	N/A	1.9	1.9	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Trichloroethene	µg/L	1,210	1,137 (NP)	1,800	1,137	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Dibenzo(a,h)anthracene	µg/L	N/A	N/A	2.4 J	2.4	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Indeno(1,2,3-cd)pyrene	µg/L	N/A	N/A	0.11 J	0.11	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Naphthalene	µg/L	0.13	0.013 (NP)	0.18	0.13	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Total PCB Aroclors	µg/L	5.1	N/A	5.1 JN	5.1	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	µg/L	9.1E-07	N/A	1.7E-06	1.7E-06	µg/L	Maximum detected	Data set consists of two samples.
	Arsenic	µg/L	13	37 (NP)	69	37	µg/L	95% Approximate Gamma UCL	Potential UCL to use from ProUCL v4.1.00
	Barium	µg/L	2,609	8,292 (NP)	8,790	8,292	µg/L	95% Chebyshev (Mean, Sd) UCL	Potential UCL to use from ProUCL v4.1.00
	Chromium	µg/L	0.51	N/A	0.57 J	0.57	µg/L	Maximum detected	95% KM (t) UCL is greater than the maximum detected concentration. Bootstrap methods are not reliable for data sets with only two distinct detected values.
	Manganese	µg/L	213	324 (NP)	484	324	µg/L	95% Student's-t UCL	Potential UCL to use from ProUCL v4.1.00

Notes¹ The arithmetic mean of detected concentrations only is presented.² The 95% Upper Confidence Level (UCL) on the arithmetic average concentration (i.e., the 95% UCL concentration) was calculated using ProUCL version 4.1.00.³ Represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

N/A = Not Applicable

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY - SHALLOW OFFSITE GROUNDWATER, NORTH OF BOUND BROOK
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Shallow Offsite Groundwater, North of Bound Brook

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean ¹	95% UCL Concentration ² (Distribution)	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Outside the Boundaries of the Former CDE Facility - Excavation	Benzene	µg/L	1.0	1.2 (NP)	1.8	1.2	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Bromodichloromethane	µg/L	0.48	0.35 (NP)	0.7	0.35	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Chloroform	µg/L	1.9	1.4 (NP)	3	1.4	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	cis-1,2-Dichloroethene	µg/L	22	49 (NP)	110	49	µg/L	95% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Tetrachloroethene	µg/L	0.43	0.38 (NP)	0.81	0.38	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Trichloroethene	µg/L	42	237 (NP)	310	237	µg/L	99% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Vinyl chloride	µg/L	0.36	N/A	0.36 J	0.36	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Benzo(g,h,i)perylene	µg/L	0.098	N/A	0.098 J	0.098	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	bis(2-Ethylhexyl)phthalate	µg/L	5.2	N/A	5.2	5.2	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Indeno(1,2,3-cd)pyrene	µg/L	0.14	0.12 (NP)	0.15	0.12	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Naphthalene	µg/L	0.13	0.11 (NP)	0.16	0.11	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Total PCB Aroclors	µg/L	0.90	0.48 (NP)	2.2	0.48	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	beta-BHC	µg/L	0.35	N/A	0.35	0.35	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	delta-BHC	µg/L	0.42	N/A	0.42	0.42	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	4,4'-DDD	µg/L	0.44	N/A	0.76 NJ	0.76	µg/L	Maximum detected	ProUCL output indicates data set is too small for meaningful results.
	4,4'-DDE	µg/L	0.75	N/A	0.75 J	0.75	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	4,4'-DDT	µg/L	0.83	0.96 (NP)	1.5 J	0.96	µg/L	97.5% KM (Chebyshev) UCL	Potential UCL to use from ProUCL v4.1.00
	Heptachlor	µg/L	0.2	N/A	0.2	0.2	µg/L	Maximum detected	Data set consists of only one distinct detected value.
	Antimony	µg/L	2.2	N/A	2.2	2.2	µg/L	Maximum detected	ProUCL output indicates data set is too small for meaningful results.
	Arsenic	µg/L	52	107 (G)	180	107	µg/L	95% Approximate Gamma UCL	Potential UCL to use from ProUCL v4.1.00
Lead	Chromium	µg/L	1.1	1.2 (NP)	3.5	1.2	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Cobalt	µg/L	0.41	0.43 (NP)	1.4	0.43	µg/L	95% KM (t) UCL	Potential UCL to use from ProUCL v4.1.00
	Lead	µg/L	3.5	N/A	20.9	3.3	µg/L	Arithmetic average concentration, including 1/2 reporting limits for non detected values	Per USEPA ALM and IEUBK Model for Lead in Children guidance
	Manganese	µg/L	242	587 (G)	1,580 J	587	µg/L	95% Adjusted Gamma UCL	Potential UCL to use from ProUCL v4.1.00
	Vanadium	µg/L	6.9	8.4 (NP)	20.5	8.4	µg/L	95% KM (BCA) UCL	Potential UCL to use from ProUCL v4.1.00

Notes

¹ The arithmetic mean of detected concentrations only is presented.

² The 95% Upper Confidence Level (UCL) on the arithmetic average concentration (i.e., the 95% UCL concentration) was calculated using ProUCL version 4.1.00.

N/A = Not Applicable

Data Distribution Codes:

G = Gamma or Approximate Gamma

NP = Nonparametric; data follow no discernible distribution

Qualifier Codes:

J - indicates an estimated value

N - indicates presumptive evidence of a compound

TABLE 4.1RME
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Dermal	Commercial / Industrial Worker	Adult	Process Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Dermal Absorbed Dose (DAD) (mg/kg-day) = $DA_{\text{derm}} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$ where for organic chemicals: Absorbed Dose per Event (DA_{derm}) (mg/cm ² -event) = If t-event < t*, then: $DA_{\text{derm}} = 2FA \times Kp \times CW \times AF1(\text{VOCs only}) \times CF \times \text{SQRT}((6 \times \text{tau-event} \times \text{t-event})/\pi)$ or If t-event > t*, then: $DA_{\text{derm}} = FA \times Kp \times CW \times AF1(\text{VOCs only}) \times CF \times \{(t\text{-event}/(1 + B)) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B))/(1 + B)^2)\}$ and where for inorganic chemicals: $DA_{\text{derm}} = Kp \times CW \times \text{t-event} \times CF$
				AF1	Apportionment Factor 1 (for VOCs)	0.9	unitless	USEPA, Region 2	
				DA_{derm}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-7	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-7	
				SA	Skin Surface Area Available for Contact	3,300	cm ²	USEPA, 2002b	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-7	
				t-event	Event Duration	8	hours/event	(2)	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-7	
				B	Ratio of permeability coefficient of a	Chemical-specific	unitless	See Table E-7	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	250	days/year	USEPA, 2002b	
				ED	Exposure Duration	25	years	USEPA, 2002b	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	--	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

Notes

(1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix

TABLE 4.2RME
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Commercial / Industrial Worker	Adult	Workplace Air	CA	Chemical Concentration in Air	See Table E-1	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = (CA x ET x EF x ED)/AT
				ET	Exposure Time	8	hours/day	(2)	
				EF	Exposure Frequency	250	days/year	USEPA, 2002b	
				ED	Exposure Duration	25	years	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	219,000	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	- -	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E
(2) Professional judgment

TABLE 4.3RME
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Dermal	Construction/Utility Worker	Adult	Top of the Groundwater Table	CW	Chemical Concentration in Groundwater	See Tables 3.2, 3.3., and 3.4	mg/L	--	Dermally Absorbed Dose (DAD) (mg/kg-day) -
				DA _{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	DA _{event} x EV x ED x EF x SA x 1/BW x 1/AT
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-8	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-8	where for organic chemicals:
				SA	Skin Surface Area Available for Contact		cm ²	USEPA, 2002b	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-8	Absorbed Dose per Event (DA _{event}) (mg/cm ² -event) -
				t-event	Event Duration		hours/event	USEPA, 1997b	If t-event < t*, then: DA _{event} = 2FA x Kp x CW x AF1(VOCs only) x CF x SQRT {(6 x tau-event x t-event)/pi}
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-8	or
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-8	If t-event > t*, then: DA _{event} = FA x Kp x CW x AF1(VOCs only) x CF x {(t-event/(1 + B)) + 2 x tau-event x ((1 + (3 x B) + (3 x B x B))/(1 + B) ²)}
				EV	Event Frequency		events/day	USEPA, 2002b	
				EF	Exposure Frequency		days/year	(2)	and where for inorganic chemicals:
				ED	Exposure Duration		years	(2)	
				CF	Volumetric Conversion Factor for Water		L/cm ³	--	DA _{event} = Kp x CW x t-event x CF
				BW	Body Weight		kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)		days	--	
				AT-C	Averaging Time (Cancer)		days	--	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix
(2) Professional judgment

TABLE 4.4RME
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Construction/Utility Worker	Adult	Outdoor Air Around an Excavation	CA	Chemical Concentration in Air	See Tables E-2, E-3, and E-4	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = $(\text{CA} \times \text{ET} \times \text{EF} \times \text{ED})/\text{AT}$
				ET	Exposure Time	8	hours/day	USEPA, 1997b	
				EF	Exposure Frequency	5	days/week	(2)	
				ED	Exposure Duration	12	weeks	(2)	
				AT-N	Averaging Time (Non-Cancer)	1,968	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	--	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E
(2) Professional judgment

TABLE 4.5RME
VALUES USED FOR DAILY INTAKE/EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake/Exposure Equation/Model Name (1)
Ingestion	Resident	Adult	Tap Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Chronic Daily Intake (CDI) (mg/kg-day) = $CW \times IR-W \times EF \times ED \times 1/BW \times 1/AT$
				IR-W	Ingestion Rate of Groundwater	2	L/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	30/24 *	years	USEPA, 2002b	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	
		Child	Tap Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Chronic Daily Intake (CDI) (mg/kg-day) = $CW \times IR-W \times EF \times ED \times 1/BW \times 1/AT$
				IR-W	Ingestion Rate of Groundwater	1	L/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	6	years	USEPA, 2002b	
				BW	Body Weight	15	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	
Dermal	Resident	Adult	Shower	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Dermally Absorbed Dose (DAD) (mg/kg-day) = $DA_{event} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$
				AF1	Apportionment Factor 1 (for VOCs)	0.9	unitless	USEPA, Region 2	
				DA_{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	where for organic chemicals: Absorbed Dose per Event (DA_{event}) (mg/cm ² -event) = If t-event < t*, then: $DA_{event} = 2FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times \text{SQRT}((6 \times \text{tau-event} \times \text{t-event})/\pi)$ or If t-event > t*, then: $DA_{event} = FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times \{(t\text{-event} \times (1 + B)) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B))/(1 + B)^2)\}$
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-9	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-9	and where for inorganic chemicals: $DA_{event} = Kp \times CW \times \text{t-event} \times CF$
				SA	Skin Surface Area Available for Contact	18,000	cm ²	USEPA, 2004	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-9	
				t-event	Event Duration	0.25	hours/event	USEPA, 2003a	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-9	
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-9	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	30/24 *	years	USEPA, 2002b	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	--	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

TABLE 4.5RME
VALUES USED FOR DAILY INTAKE/EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake/Exposure Equation/ Model Name (1)
Dermal	Resident	Child	Shower	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	—	Dermal Absorbed Dose (DAD) (mg/kg-day) = $DA_{event} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$ where for organic chemicals: Absorbed Dose per Event (DA_{event}) (mg/cm ² -event) = If t-event < t*, then: $DA_{event} = 2FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times \text{SQRT}\{(6 \times \text{tau-event} \times \text{t-event})/\pi\}$ or If t-event > t*, then: $DA_{event} = FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times \{(t-event)(1 + B) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B))(1 + B)^2)\}$ and where for inorganic chemicals: $DA_{event} = Kp \times CW \times \text{t-event} \times CF$
				AF1	Apportionment Factor 1 (for VOCs)	0.9	unitless	USEPA, Region 2	
				DA _{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-10	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-10	
				SA	Skin Surface Area Available for Contact	6,600	cm ²	USEPA, 2004	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-10	
				t-event	Event Duration	0.45	hours/event	USEPA, 2003a	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-10	
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-10	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	6	years	USEPA, 2002b	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	—	
				BW	Body Weight	15	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

Notes

(1) Information regarding modeled intake/exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E.

* = For the adult resident, non-cancer hazard quotients are computed based on an exposure duration of 30 years as an adult. A combined adult/child cancer risk (rather than a strictly adult cancer risk) is computed as six years at the child's rate of exposure and 24 years at the adult's rate of exposure (USEI 1991).

TABLE 4.6RME
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Resident	Adult	Bathroom Air	CA	Chemical Concentration in Air	See Table E-5	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = (CA x ET x EF x ED)/AT
				ET	Exposure Time	0.58	hours/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	30/24 *	years	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	262,800	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	--	
		Child	Bathroom Air	CA	Chemical Concentration in Air	See Table E-6	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = (CA x ET x EF x ED)/AT
				ET	Exposure Time	1	hours/day	USEPA, 2004	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	6	years	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	52,560	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	--	

Notes

(1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E.

* = For the adult resident, non-cancer hazard quotients are computed based on an exposure duration of 30 years as an adult. A combined adult/child cancer risk (rather than a strictly adult cancer risk) is computed as six years at the child's rate of exposure and 24 years at the adult's rate of exposure (USEPA, 1991).

TABLE 4.7RME
CALCULATION OF AGE-ADJUSTED EXPOSURE FACTORS FOR RESIDENT ADULTS AND CHILDREN
REASONABLE MAXIMUM EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

						Age-Adjusted Chronic Daily Intakes (CDI) for Cancer Risk Assessment				
Age	Exposure Duration (ED)	Exposure Frequency (EF)	Body Weight ¹ (BW)	Ingestion Rate of Groundwater ² (IR-W)	Skin Surface Area Available for Contact ³ (SA)	Age Group	Groundwater Ingestion CDI	Dermal CDI	Ingestion CDI	Dermal CDI
(year)	(years)	(days)	(kg)	(L/day)	(cm ²)		(L/kg-day)	(cm ² -event/kg-day)	(L/kg-day)	(cm ² -event/kg-day)
0	1	350	6.8	1	3,600	0-2 yrs Average	1.6E-03	6.8E+00	2.0E-03	7.3E+00
1	1	350	11.4	1	5,300				1.2E-03	6.4E+00
2	1	350	13.5	1	6,020	2-6 yrs Average	8.3E-04	5.8E+00	1.0E-03	6.1E+00
3	1	350	15.55	1	6,694				8.8E-04	5.9E+00
4	1	350	18.2	1	7,506				7.5E-04	5.6E+00
5	1	350	20.95	1	8,274				6.5E-04	5.4E+00
6	1	350	22.95	2	8,847	6-16 yrs Average	7.0E-04	4.3E+00	1.2E-03	5.3E+00
7	1	350	26.55	2	9,775				1.0E-03	5.0E+00
8	1	350	32.3	2	11,043				8.5E-04	4.7E+00
9	1	350	35.7	2	11,840				7.7E-04	4.5E+00
10	1	350	39.3	2	12,623				7.0E-04	4.4E+00
11	1	350	45.8	2	13,963				6.0E-04	4.2E+00
12	1	350	51.2	2	15,010				5.4E-04	4.0E+00
13	1	350	55.8	2	15,865				4.9E-04	3.9E+00
14	1	350	61.9	2	16,980				4.4E-04	3.8E+00
15	1	350	64.7	2	17,492				4.2E-04	3.7E+00
16	1	350	68.7	2	18,000	16-30 yrs Average	3.8E-04	3.5E+00	4.0E-04	3.6E+00
17	1	350	68.65	2	18,000				4.0E-04	3.6E+00
18	1	350	71.8	2	18,000				3.8E-04	3.4E+00
19	1	350	71.8	2	18,000				3.8E-04	3.4E+00
20	1	350	71.8	2	18,000				3.8E-04	3.4E+00
21	1	350	71.8	2	18,000				3.8E-04	3.4E+00
22	1	350	71.8	2	18,000				3.8E-04	3.4E+00
23	1	350	71.8	2	18,000				3.8E-04	3.4E+00
24	1	350	71.8	2	18,000				3.8E-04	3.4E+00
25	1	350	71.8	2	18,000				3.8E-04	3.4E+00
26	1	350	71.8	2	18,000				3.8E-04	3.4E+00
27	1	350	71.8	2	18,000				3.8E-04	3.4E+00
28	1	350	71.8	2	18,000				3.8E-04	3.4E+00
29	1	350	71.8	2	18,000				3.8E-04	3.4E+00

Equations: Chronic Daily Intake (CDI) (L/kg-day) =

Ingestion:

$IR \times EF \times ED / (BW \times AT)$

Dermal:

$SA \times EV \times EF \times ED / (BW \times AT)$

where: AT = Averaging time - Cancer (days) = 25,550

Notes

¹ Body weights are mean values for males and females; for ages 0-1 and 2-17, respectively, from Tables 8-3 and 8-13 in Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 18-29, the recommended value for 18-75 years from Table 7-2 in Exposure Factors Handbook (USEPA, 1997b).

² Drinking water ingestion rate are recommended values in Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA, 2002).

³ Total body surface areas for males and females; for ages 0-1, from Table 7-1 of Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 0-15, based on Equation 7A-3 in Appendix 7A of Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 16-29, the default value for adults from Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (USEPA, 2004).

TABLE 4.1CT
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Dermal	Commercial / Industrial Worker	Adult	Process Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Dermally Absorbed Dose (DAD) (mg/kg-day) = $DA_{t=0} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$ where for organic chemicals: Absorbed Dose per Event ($DA_{t=0}$) (mg/cm ² -event) = If t-event < t*, then: $DA_{t=0} = 2FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times \sqrt{t}$ (6 x tau-event x t-event/pi) or If t-event > t*, then: $DA_{t=0} = FA \times Kp \times CW \times AF1(VOCs \text{ only}) \times CF \times ((t-event/(1 + B)) + 2 \times tau-event \times ((1 + (3 \times B) + (3 \times B \times B)) \times (1 + B)^2))$ and where for inorganic chemicals: $DA_{t=0} = Kp \times CW \times t-event \times CF$
				AF1	Apportionment Factor 1 (for VOCs)	0.5	unitless	USEPA, Region 2	
				$DA_{t=0}$	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-7	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-7	
				SA	Skin Surface Area Available for Contact	3,300	cm ²	USEPA, 2002b	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-7	
				t-event	Event Duration	6	hours/event	(2)	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-7	
				B	Ratio of permeability coefficient of a	Chemical-specific	unitless	See Table E-7	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	250	days/year	USEPA, 2002b	
				ED	Exposure Duration	6.6	years	USEPA, 1997b	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	--	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	2,409	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

Notes

(1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E.

TABLE 4.2CT
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Commercial / Industrial Worker	Adult	Workplace Air	CA	Chemical Concentration in Air	See Table E-1	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = (CA x ET x EF x ED)/AT
				ET	Exposure Time	6	hours/day	(2)	
				EF	Exposure Frequency	250	days/year	USEPA, 2002b	
				ED	Exposure Duration	6.6	years	USEPA, 1997b	
				AT-N	Averaging Time (Non-Cancer)	57,816	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	--	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E
(2) Professional judgment

TABLE 4.3CT
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Shallow Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Exposure Equation/Model Name (1)
Dermal	Construction/Utility Worker	Adult	Top of the Groundwater Table	CW	Chemical Concentration in Groundwater	See Tables 3.2, 3.3, and 3.4	mg/L	--	Dermal Absorbed Dose (DAD) (mg/kg-day) = $DA_{event} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$ where for organic chemicals: Absorbed Dose per Event (DA_{event}) (mg/cm ² -event) = If t-event < t*, then: $DA_{event} = 2FA \times Kp \times CW \times AF \{ (VOCs \text{ only}) \} \times CF \times \sqrt{6 \times \text{tau-event} \times \text{t-event} / \pi}$ or If t-event > t*, then: $DA_{event} = FA \times Kp \times CW \times AF \{ (VOCs \text{ only}) \} \times CF \times \{ (\text{t-event} \times (1 + B)) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B)) \times (1 + B)^2) \}$ and where for inorganic chemicals: $DA_{event} = Kp \times CW \times \text{t-event} \times CF$
				DA _{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-8	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-8	
				SA	Skin Surface Area Available for Contact	3,300	cm ²	USEPA, 2002b	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-8	
				t-event	Event Duration	6	hours/event	(2)	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-8	
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-8	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	20	days/year	(2)	
				ED	Exposure Duration	1	years	(2)	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	--	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	26	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E.
(2) Professional judgment

TABLE 4.4CT
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Construction/Utility Worker	Adult	Outdoor Air Around an Excavation	CA	Chemical Concentration in Air	See Tables E-2, E-3, and E-4	$\mu\text{g}/\text{m}^3$	See Appendix E	Exposure Concentration (EC) ($\mu\text{g}/\text{m}^3$) = $(\text{CA} \times \text{ET} \times \text{EF} \times \text{ED})/\text{AT}$
				ET	Exposure Time	6	hours/day	(2)	
				EF	Exposure Frequency	5	days/week	(2)	
				ED	Exposure Duration	4	weeks	(2)	
				AT-N	Averaging Time (Non-Cancer)	624	hours	USEPA, 2009a	
				AT-C	Averaging Time (Cancer)	613,200	hours	- -	

Notes

- (1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E
(2) Professional judgment

TABLE 4.5CT
VALUES USED FOR DAILY INTAKE/EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake/Exposure Equation/Model Name (1)
Ingestion	Resident	Adult	Tap Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Chronic Daily Intake (CDI) (mg/kg-day) = $CW \times IR-W \times EF \times ED \times 1/BW \times 1/AT$
				IR-W	Ingestion Rate of Groundwater	1	L/day	(2)	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	9	years	USEPA, 1989	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	3,285	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	
		Child	Tap Water	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Chronic Daily Intake (CDI) (mg/kg-day) = $CW \times IR-W \times EF \times ED \times 1/BW \times 1/AT$
				IR-W	Ingestion Rate of Groundwater	0.5	L/day	(2)	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	6	years	USEPA, 2002b	
				BW	Body Weight	15	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	
Dermal	Resident	Adult	Shower	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	--	Dermally Absorbed Dose (DAD) (mg/kg-day) = $DA_{event} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$ where for organic chemicals: Absorbed Dose per Event (DA_{event}) (mg/cm ² -event) = If t-event < t*, then: $DA_{event} = 2FA \times Kp \times CW \times AFI(VOCs \text{ only}) \times CF \times \sqrt{6 \times \text{tau-event} \times t\text{-event} \times \pi}$ or If t-event > t*, then: $DA_{event} = FA \times Kp \times CW \times AFI(VOCs \text{ only}) \times CF \times \{(t\text{-event} \times (1 + B)) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B))/(1 + B)^2)\}$ and where for inorganic chemicals: $DA_{event} = Kp \times CW \times t\text{-event} \times CF$
				AFI	Apportionment Factor I (for VOCs)	0.5	unitless	USEPA, Region 2	
				DA_{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-9	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-9	
				SA	Skin Surface Area Available for Contact	18,000	cm ²	USEPA, 2004	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-9	
				t-event	Event Duration	0.11	hours/event	(2)	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-9	
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-9	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	9	years	USEPA, 1989	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	--	
				BW	Body Weight	70	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	3,285	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

TABLE 4.5CT
VALUES USED FOR DAILY INTAKE/EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Entire Aquifer

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake/Exposure Equation/Model Name (1)
Dermal	Resident	Child	Shower	CW	Chemical Concentration in Groundwater	See Table 3.1	mg/L	—	<p>Dermally Absorbed Dose (DAD) (mg/kg-day) = $DA_{event} \times EV \times ED \times EF \times SA \times 1/BW \times 1/AT$</p> <p>where for organic chemicals:</p> <p>Absorbed Dose per Event (DA_{event}) (mg/cm²-event) =</p> <p>If t-event < t*, then: $DA_{event} = 2FA \times Kp \times CW \times AFI(VOCs \text{ only}) \times CF \times \sqrt{6 \times \text{tau-event} \times t\text{-event}}$ pr{</p> <p>or</p> <p>If t-event > t*, then: $DA_{event} = FA \times Kp \times CW \times AFI(VOCs \text{ only}) \times CF \times \{(t\text{-event}/(1 + B)) + 2 \times \text{tau-event} \times ((1 + (3 \times B) + (3 \times B \times B)) \times (1 + B)2)\}$</p> <p>and where for inorganic chemicals:</p> <p>$DA_{event} = Kp \times CW \times t\text{-event} \times CF$</p>
				AF1	Apportionment Factor 1 (for VOCs)	0.5	unitless	USEPA, Region 2	
				DA _{event}	Absorbed dose per event	Chemical-specific	mg/cm ² -event	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	See Table E-10	
				Kp	Permeability Coefficient	Chemical-specific	cm/hour	See Table E-10	
				SA	Skin Surface Area Available for Contact	6,600	cm ²	USEPA, 2004	
				tau-event	Lag time per event	Chemical-specific	hours/event	See Table E-10	
				t-event	Event Duration	0.15	hours/event	(2)	
				t*	Time to reach steady-state = 2.4 x tau-event	Chemical-specific	hours	See Table E-10	
				B	Ratio of permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical-specific	unitless	See Table E-10	
				EV	Event Frequency	1	events/day	USEPA, 2002b	
				EF	Exposure Frequency	350	days/year	USEPA, 2002b	
				ED	Exposure Duration	6	years	USEPA, 2002b	
				CF	Volumetric Conversion Factor for Water	0.001	L/cm ³	—	
				BW	Body Weight	15	kg	USEPA, 2002b	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	--	
				AT-C	Averaging Time (Cancer)	25,550	days	--	

Notes

- (1) Information regarding modeled intake/exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix
(2) Professional judgment

TABLE 4.6CT
VALUES USED FOR DAILY EXPOSURE CALCULATIONS
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Exposure Equation/ Model Name (1)
Inhalation	Resident	Adult	Bathroom Air	CA	Chemical Concentration in Air	See Table E-5	$\mu\text{g}/\text{m}^3$	See Appendix E USEPA, 2004 USEPA, 2002b USEPA, 1989 USEPA, 2009a --	$\text{Exposure Concentration (EC)} (\mu\text{g}/\text{m}^3) = (\text{CA} \times \text{ET} \times \text{EF} \times \text{ED})/\text{AT}$
				ET	Exposure Time	0.25	hours/day		
				EF	Exposure Frequency	350	days/year		
				ED	Exposure Duration	9	years		
				AT-N	Averaging Time (Non-Cancer)	78,840	hours		
				AT-C	Averaging Time (Cancer)	613,200	hours		
		Child	Bathroom Air	CA	Chemical Concentration in Air	See Table E-6	$\mu\text{g}/\text{m}^3$	See Appendix E USEPA, 2004 USEPA, 2002b USEPA, 2002b USEPA, 2009a --	$\text{Exposure Concentration (EC)} (\mu\text{g}/\text{m}^3) = (\text{CA} \times \text{ET} \times \text{EF} \times \text{ED})/\text{AT}$
				ET	Exposure Time	0.33	hours/day		
				EF	Exposure Frequency	350	days/year		
				ED	Exposure Duration	6	years		
				AT-N	Averaging Time (Non-Cancer)	52,560	hours		
				AT-C	Averaging Time (Cancer)	613,200	hours		

Notes

(1) Information regarding modeled exposure can be found in Section 3.4, Estimates of Chemical Intake/Exposure and Appendix E.

TABLE 4.7CT
CALCULATION OF AGE-ADJUSTED EXPOSURE FACTORS FOR RESIDENT ADULTS AND CHILDREN
CENTRAL TENDENCY EXPOSURE
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Age (year)	Exposure Duration (ED) (years)	Exposure Frequency (EF) (days)	Body Weight ¹ (BW) (kg)	Ingestion Rate of Groundwater ² (IR-W) (L/day)	Skin Surface Area Available for Contact ³ (SA) (cm ²)	Age-Adjusted Chronic Daily Intakes (CDI) for Cancer Risk Assessment				
						Age Group	Groundwater Ingestion CDI (L/kg-day)	Dermal CDI (cm ² -event/kg-day)	Ingestion CDI (L/kg-day)	Dermal CDI (cm ² -event/kg-day)
0	1	350	6.8	0.5	3,600	0-<2 yrs Average	8.0E-04	6.8E+00	1.0E-03	7.3E+00
1	1	350	11.4	0.5	5,300				6.0E-04	6.4E+00
2	1	350	13.5	0.5	6,020	2-<6 yrs Average	4.1E-04	5.8E+00	5.1E-04	6.1E+00
3	1	350	15.55	0.5	6,694				4.4E-04	5.9E+00
4	1	350	18.2	0.5	7,506				3.8E-04	5.6E+00
5	1	350	20.95	0.5	8,274				3.3E-04	5.4E+00
6	1	350	22.95	1	8,847	6-<16 yrs Average	3.5E-04	4.3E+00	6.0E-04	5.3E+00
7	1	350	26.55	1	9,775				5.2E-04	5.0E+00
8	1	350	32.3	1	11,043				4.2E-04	4.7E+00
9	1	350	35.7	1	11,840				3.8E-04	4.5E+00
10	1	350	39.3	1	12,623				3.5E-04	4.4E+00
11	1	350	45.8	1	13,963				3.0E-04	4.2E+00
12	1	350	51.2	1	15,010				2.7E-04	4.0E+00
13	1	350	55.8	1	15,865				2.5E-04	3.9E+00
14	1	350	61.9	1	16,980				2.2E-04	3.8E+00
15	1	350	64.7	1	17,492				2.1E-04	3.7E+00
16	1	350	68.7	1	18,000	16-<30 yrs Average	1.9E-04	3.5E+00	2.0E-04	3.6E+00
17	1	350	68.65	1	18,000				2.0E-04	3.6E+00
18	1	350	71.8	1	18,000				1.9E-04	3.4E+00
19	1	350	71.8	1	18,000				1.9E-04	3.4E+00
20	1	350	71.8	1	18,000				1.9E-04	3.4E+00
21	1	350	71.8	1	18,000				1.9E-04	3.4E+00
22	1	350	71.8	1	18,000				1.9E-04	3.4E+00
23	1	350	71.8	1	18,000				1.9E-04	3.4E+00
24	1	350	71.8	1	18,000				1.9E-04	3.4E+00
25	1	350	71.8	1	18,000				1.9E-04	3.4E+00
26	1	350	71.8	1	18,000				1.9E-04	3.4E+00
27	1	350	71.8	1	18,000				1.9E-04	3.4E+00
28	1	350	71.8	1	18,000				1.9E-04	3.4E+00
29	1	350	71.8	1	18,000				1.9E-04	3.4E+00

Equations: Chronic Daily Intake (CDI) (L/kg-day) =

Ingestion:

$IR \times EF \times ED / (BW \times AT)$

Dermal:

$SA \times EV \times EF \times ED / (BW \times AT)$

where: AT = Averaging time - Cancer (days) = 25,550

Notes

¹ Body weights are mean values for males and females; for ages 0-1 and 2-17, respectively, from Tables 8-3 and 8-13 in Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 18-29, the recommended value for 18-75 years from Table 7-2 in Exposure Factors Handbook (USEPA, 1997b).

² Drinking water ingestion rate are based on professional judgment

³ Total body surface areas for males and females; for ages 0-1, from Table 7-1 of Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 0-15, based on Equation 7A-3 in Appendix 7A of Child-Specific Exposure Factors Handbook (USEPA, 2008), and for ages 16-29, the default value for adults from Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (USEPA, 2004).

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral Reference Dose (RfD)		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD : Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Benzene	Chronic	4.0E-03	mg/kg-day	1	4.0E-03	mg/kg-day	Decreased lymphocyte count	300	IRIS	1/25/2011
	Subchronic	1.2E-02	mg/kg-day	1	1.2E-02	mg/kg-day	Decreased lymphocyte count	100	IRIS	1/25/2011
Bromodichloromethane	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Kidney effects	1,000	IRIS	1/25/2011
	Subchronic ¹	8.0E-03	mg/kg-day	1	8.0E-03	mg/kg-day	Developmental toxicity	100	NCEA	9/16/2009
Chlorobenzene	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Histopathologic changes in liver	1,000	IRIS	1/25/2011
	Subchronic	7.0E-02	mg/kg-day	1	7.0E-02	mg/kg-day	Liver, kidney, gastrointestinal tract, and hematological effects	300	NCEA	10/12/2006
Chloroform	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Liver effects	100	IRIS	1/25/2011
	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
1,2-Dibromo-3-chloropropane	Chronic	2.0E-04	mg/kg-day	1	2.0E-04	mg/kg-day	NOAEL / Testicular effects	3,000	NCEA	8/3/2006
	Subchronic	2.0E-03	mg/kg-day	1	2.0E-03	mg/kg-day	NOAEL / Testicular effects	300	NCEA	8/3/2006
Dibromochloromethane	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Hepatic lesions	1,000	IRIS	1/25/2011
	Subchronic	7.0E-02	mg/kg-day	1	7.0E-02	mg/kg-day	Hepatic lesions	300	NCEA	9/30/2009
1,2-Dichlorobenzene	Chronic	9.0E-02	mg/kg-day	1	9.0E-02	mg/kg-day	No adverse effects observed	1,000	IRIS	1/25/2011
	Subchronic	6.0E-01	mg/kg-day	1	6.0E-01	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
1,3-Dichlorobenzene	Chronic	N/A	--	--	N/A	--	--	--	--	--
	Subchronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Endocrine effects	100	ATSDR	12/1/2009
1,4-Dichlorobenzene	Chronic	7.0E-02	mg/kg-day	1	7.0E-02	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
	Subchronic	7.0E-02	mg/kg-day	1	7.0E-02	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
1,1-Dichloroethane	Chronic	2.0E-01	mg/kg-day	1	2.0E-01	mg/kg-day	NOAEL / Kidney damage and CNS suppression	3,000	NCEA	9/27/2006
	Subchronic	2.0E+00	mg/kg-day	1	2.0E+00	mg/kg-day	NOAEL / Kidney damage and CNS suppression	300	NCEA	9/27/2006
1,2-Dichloroethane	Chronic	N/A	--	1	N/A	--	--	--	NCEA	10/1/2010
	Subchronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Kidney effects	3,000	NCEA	10/1/2010
1,1-Dichloroethene	Chronic	5.0E-02	mg/kg-day	1	5.0E-02	mg/kg-day	Liver toxicity	100	IRIS	1/25/2011
	Chronic	2.0E-03	mg/kg-day	1	2.0E-03	mg/kg-day	Increased kidney weight	3,000	IRIS	1/25/2011
cis-1,2-Dichloroethene	Subchronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Increased kidney weight	300	IRIS	1/25/2011
	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Red blood cell effects	3,000	IRIS	1/25/2011
trans-1,2-Dichloroethene	Subchronic	2.0E-01	mg/kg-day	1	2.0E-01	mg/kg-day	Red blood cell effects	300	IRIS	1/25/2011
	Chronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Liver and kidney toxicity	1,000	IRIS	1/25/2011
Ethylbenzene	Subchronic ¹	5.0E-02	mg/kg-day	1	5.0E-02	mg/kg-day	Liver effects	1,000	NCEA	9/10/2009
Methylcyclohexane	--	N/A	--	--	N/A	--	--	--	--	--
Methyl tert-butyl ether	Chronic	N/A	--	--	N/A	--	--	--	--	--
	Subchronic	3.0E-01	mg/kg-day	1	3.0E-01	mg/kg-day	Liver effects	300	ATSDR	12/1/2009
Methylene chloride	Chronic	6.0E-02	mg/kg-day	1	6.0E-02	mg/kg-day	Liver effects	100	IRIS	1/25/2011
	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Liver toxicity	1,000	IRIS	1/25/2011
Tetrachloroethene	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Liver toxicity	100	IRIS	1/25/2011

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral Reference Dose (RfD)		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD : Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,1,2-Trichloroethane	Chronic	4.0E-03	mg/kg-day	1	4.0E-03	mg/kg-day	Clinical serum chemistry	1,000	IRIS	1/25/2011
	Subchronic ¹	3.9E-03	mg/kg-day	1	3.9E-03	mg/kg-day	NOAEL / Liver toxicity	1,000	NCEA	10/17/2006
	Chronic	N/A	--	--	N/A	--	--	--	NCEA	9/11/2009
1,2,3-Trichlorobenzene	Subchronic	8.0E-03	mg/kg-day	1	8.0E-03	mg/kg-day	NOAEL / Reduced body weight gain, liver and thyroid effects	1,000	NCEA	9/11/2009
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Increased adrenal weights	1,000	IRIS	1/25/2011
	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Increased adrenal weights	100	IRIS	1/25/2011
Trichloroethene	--	N/A	--	--	N/A	--	--	--	--	--
o-Xylene	Chronic	2.0E-01	mg/kg-day	1	2.0E-01	mg/kg-day	Decreased body weight, increased mortality	1,000	IRIS	6/22/2011
	Subchronic	4.0E-01	mg/kg-day	1	4.0E-01	mg/kg-day	Decreased body weight	1,000	NCEA	4/4/2011
Vinyl chloride	Chronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Liver cell polymorphism	30	IRIS	1/25/2011
Benzo(a)anthracene	--	N/A	--	--	N/A	--	--	--	--	--
Benzo(a)pyrene	--	N/A	--	--	N/A	--	--	--	--	--
Benzo(b)fluoranthene	--	N/A	--	--	N/A	--	--	--	--	--
Benzo(g,h,i)perylene	--	N/A	--	--	N/A	--	--	--	--	--
Benzo(k)fluoranthene	--	N/A	--	--	N/A	--	--	--	--	--
1,1-Biphenyl	Chronic	5.0E-02	mg/kg-day	1	5.0E-02	mg/kg-day	Kidney damage	1,000	IRIS	6/22/2011
	Subchronic	1.0E-01	mg/kg-day	1	1.0E-01	mg/kg-day	Developmental toxicity	100	NCEA	9/30/2009
	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Increased liver weight	1,000	IRIS	1/25/2011
bis(2-Ethylhexyl) phthalate	Subchronic	2.0E-01	mg/kg-day	1	2.0E-01	mg/kg-day	Increased liver weight	100	IRIS	1/25/2011
Dibenzo(a,h)anthracene	--	N/A	--	--	N/A	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	--	N/A	--	--	N/A	--	--	--	--	--
Naphthalene	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Decreased mean body weight	3,000	IRIS	1/25/2011
	Subchronic	2.0E-01	mg/kg-day	1	2.0E-01	mg/kg-day	Decreased mean body weight	300	IRIS	1/25/2011
Phenanthrene	--	N/A	--	--	N/A	--	--	--	--	--
Polychlorinated biphenyls, total (as Aroclor 1254)	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Eye effects; finger and toe nail effects; immunological effects	300	IRIS	1/25/2011
	Subchronic	6.0E-05	mg/kg-day	1	6.0E-05	mg/kg-day	Eye effects; finger and toe nail effects; immunological effects	100	IRIS	1/25/2011
2,3,7,8-TCDD	Chronic	1.0E-09	mg/kg-day	1	1E-09	mg/kg-day	Developmental effects	90	ATSDR	12/1/2009
	Subchronic	2.0E-08	mg/kg-day	1	2E-08	mg/kg-day	Lymphoreticular effects	30	ATSDR	12/1/2009
4,4'-DDD	--	N/A	--	--	N/A	--	--	--	--	--
4,4'-DDE	--	N/A	--	--	N/A	--	--	--	--	--
4,4'-DDT	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver lesions	100	IRIS	1/25/2011
	Subchronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
alpha-BHC	Chronic	8.0E-03	mg/kg-day	1	8.0E-03	mg/kg-day	Liver effects	100	ATSDR	12/1/2009
	Chronic	N/A	--	--	N/A	--	--	--	--	--
beta-BHC	Subchronic	6.0E-04	mg/kg-day	1	6.0E-04	mg/kg-day	Liver effects	300	ATSDR	12/1/2009
delta-BHC	--	N/A	--	--	N/A	--	--	--	--	--
gamma-BHC	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Liver and kidney toxicity	1,000	IRIS	1/25/2011
	Subchronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Liver and kidney toxicity	100	IRIS	1/25/2011

TABLE 5.1
NON-CANCER TOXICITY DATA -- ORAL/DERMAL
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Oral Reference Dose (RfD)		Oral Absorption Efficiency for Dermal	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD : Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
gamma-Chlordane	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver necrosis	300	IRIS	1/25/2011
Dieldrin	Chronic	5.0E-05	mg/kg-day	1	5.0E-05	mg/kg-day	Liver lesions	100	IRIS	1/25/2011
	Subchronic	1.0E-04	mg/kg-day	1	1.0E-04	mg/kg-day	Neurological effects	100	ATSDR	12/1/2009
Endosulfan II	Chronic	6.0E-03	mg/kg-day	1	6.0E-03	mg/kg-day	Reduced body weight gain, blood and kidney effects	100	IRIS	1/25/2011
Endosulfan sulfate	--	N/A	--	--	N/A	--	--	--		
Endrin aldehyde	--	N/A	--	--	N/A	--	--	--		
Heptachlor	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Increased liver weight	300	IRIS	1/25/2011
Aluminum	Chronic	1.0E+00	mg/kg-day	1	1.0E+00	mg/kg-day	Neurotoxicity	100	NCEA	10/23/2006
	Subchronic	1.0E+00	mg/kg-day	1	1.0E+00	mg/kg-day	Neurological effects	30	ATSDR	12/1/2009
Antimony	Chronic	4.0E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	Longevity, blood glucose, and cholesterol	1,000	IRIS	1/25/2011
	Subchronic	4.0E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	Longevity, blood glucose, and cholesterol	1,000	NCEA	7/29/2008
Arsenic	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Hyperpigmentation, keratosis	3	IRIS	1/25/2011
Barium	Chronic	2.0E-01	mg/kg-day	0.07	1.4E-02	mg/kg-day	Nephropathy	300	IRIS	1/25/2011
	Subchronic	2.0E-01	mg/kg-day	0.07	1.4E-02	mg/kg-day	Kidney effects	300	ATSDR	12/1/2009
Cadmium	Chronic	5.0E-04	mg/kg-day	0.05	2.5E-05	mg/kg-day	Significant proteinuria	10	IRIS	1/25/2011
	Subchronic	5.0E-04	mg/kg-day	0.05	2.5E-05	mg/kg-day	Musculoskeletal effects	100	ATSDR	12/1/2009
Chromium (as Cr VI)	Chronic	3.0E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	None reported	900	IRIS	1/25/2011
	Subchronic	2.0E-02	mg/kg-day	0.025	5.0E-04	mg/kg-day	None reported	100	HEAST	7/1/1997
Cobalt	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Thyroid toxicity	1,000	NCEA	8/25/2008
	Subchronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Thyroid toxicity	300	NCEA	8/25/2008
Iron	Chronic	7.0E-01	mg/kg-day	1	7.0E-01	mg/kg-day	Gastrointestinal toxicity	1.5	NCEA	9/11/2006
	Subchronic	7.0E-01	mg/kg-day	1	7.0E-01	mg/kg-day	Gastrointestinal toxicity	1.5	NCEA	9/11/2006
Lead	--	N/A	--	--	N/A	--	--	--		
Manganese	Chronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	Central nervous system effects	1	IRIS	1/25/2011
Vanadium	Chronic	5.0E-03	mg/kg-day	0.026	1.3E-04	mg/kg-day	Decreased hair cysteine	100	IRIS ²	1/25/2011

Notes
Gastrointestinal absorption efficiencies are from Exhibit 4-1 in USEPA, 2004. See Section 4, "Toxicity Assessment," of the Human Health Risk Assessment text.
IRIS = Integrated Risk Information System (USEPA, 2011b)
NCEA = National Center for Environmental Assessment, Provisional Peer-Reviewed Toxicity Value
ATSDR = Agency for Toxic Substances and Disease Registry, Minimal Risk Level (ATSDR, 2009)

N/A = Not Available
NOAEL = No Observed Adverse Effect Level

¹ The subchronic RfD is from a different source than the chronic RfD. The subchronic value is lower than the chronic value and will therefore not be used in the noncancer hazard calculation

² RfD is specific to vanadium pentoxide and was corrected for vanadium per the USEPA Regional Screening Levels User's Guide, Section 5.4 (USEPA, 201

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation Reference Concentration		Extrapolated Reference Dose (RfD)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Benzene	Chronic	3.0E-02	mg/m ³	NA	--	Decreased lymphocyte count	300	IRIS	1/25/2011
	Subchronic	9.0E-02	mg/m ³	NA	--	Decreased lymphocyte count	100	IRIS	1/25/2011
Bromodichloromethane	Chronic	N/A	--	NA	--	--	--	NCEA	9/16/2009
	Subchronic	2.0E-02	mg/m ³	NA	--	NOAEL / Kidney degeneration	300	NCEA	9/16/2009
Chlorobenzene	Chronic	5.0E-02	mg/m ³	NA	--	Kidney effects	1,000	NCEA	10/12/2006
	Subchronic	5.0E-01	mg/m ³	NA	--	Kidney effects	100	NCEA	10/12/2006
Chloroform	Chronic	9.8E-02	mg/m ³	NA	--	Liver effects	100	ATSDR	12/1/2009
	Subchronic	2.4E-01	mg/m ³	NA	--	Liver effects	300	ATSDR	12/1/2009
1,2-Dibromo-3-chloropropane	Chronic	2.0E-04	mg/m ³	NA	--	Testicular effects	1,000	IRIS	1/25/2011
	Subchronic	2.0E-03	mg/m ³	NA	--	Testicular effects	100	IRIS	1/25/2011
Dibromochloromethane	Chronic	N/A	--	NA	--	--	--	NCEA	9/30/2009
	Subchronic	N/A	--	NA	--	--	--	NCEA	9/30/2009
1,2-Dichlorobenzene	Chronic	2.0E-01	mg/m ³	NA	--	Decreased weight gain	1,000	HEAST	7/1/1997
	Subchronic	2.0E+00	mg/m ³	NA	--	Liver lesions	100	HEAST	7/1/1997
1,3-Dichlorobenzene	--	N/A	--	NA	--	--	--	--	--
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m ³	NA	--	Increased liver weight	100	IRIS	1/25/2011
	Subchronic	2.4E+00	mg/m ³	NA	--	Increased liver weight	33	IRIS	1/25/2011
1,1-Dichloroethane	Chronic	N/A	--	NA	--	--	--	NCEA	9/27/2006
	Subchronic	N/A	--	NA	--	--	--	NCEA	9/27/2006
1,2-Dichloroethane	Chronic	7.0E-03	mg/m ³	NA	--	Neurobehavioral impairment	3,000	NCEA	10/1/2010
	Subchronic	7.0E-02	mg/m ³	NA	--	Neurobehavioral impairment	300	NCEA	10/1/2010
1,1-Dichloroethene	Chronic	2.0E-01	mg/m ³	NA	--	Liver toxicity	30	IRIS	1/25/2011
	Subchronic ¹	7.9E-02	mg/m ³	NA	--	Liver effects	100	ATSDR	12/1/2009
cis-1,2-Dichloroethene	Chronic	N/A	--	NA	--	--	--	NCEA	2/3/2011
	Subchronic	N/A	--	NA	--	--	--	NCEA	2/3/2011
trans-1,2-Dichloroethene	Chronic	6.0E-02	mg/m ³	NA	--	Liver and lung effects	3,000	NCEA	3/1/2006
	Subchronic	7.9E-01	mg/m ³	NA	--	Liver effects	1,000	ATSDR	12/1/2009
Ethylbenzene	Chronic	1.0E+00	mg/m ³	NA	--	Developmental toxicity	300	IRIS	1/25/2011
	Subchronic	9.0E+00	mg/m ³	NA	--	Ototoxicity (ear hair loss)	100	NCEA	9/10/2009
Methylcyclohexane	Chronic	3.0E+00	mg/m ³	NA	--	Kidney effects	100	HEAST	7/1/1997
	Subchronic	3.0E+00	mg/m ³	NA	--	Kidney effects	100	HEAST	7/1/1997
Methyl tert-butyl ether	Chronic	3.0E+00	mg/m ³	NA	--	Increased liver and kidney weight	100	IRIS	1/25/2011
	Subchronic ¹	2.5E+00	mg/m ³	NA	--	Neurological effects	100	ATSDR	12/1/2009
Methylene chloride	Chronic	1.0E+00	mg/m ³	NA	--	Liver effects	30	ATSDR	12/1/2009
	Subchronic	1.0E+00	mg/m ³	NA	--	Liver effects	90	ATSDR	12/1/2009
Tetrachloroethene	Chronic	2.7E-01	mg/m ³	NA	--	Neurological effects	100	ATSDR	12/1/2009
1,1,2-Trichloroethane	Chronic	N/A	--	NA	--	--	--	NCEA	7/5/2006
	Subchronic	N/A	--	NA	--	--	--	NCEA	7/5/2006
1,2,3-Trichlorobenzene	Chronic	N/A	--	NA	--	--	--	NCEA	9/11/2009
	Subchronic	N/A	--	NA	--	--	--	NCEA	9/11/2009

TABLE 5.2
NON-CANCER TOXICITY DATA – INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation Reference Concentration		Extrapolated Reference Dose (RfD)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
1,2,4-Trichlorobenzene	Chronic	2.0E-03	mg/m ³	NA	--	Blood effects (as evidenced by increased urinary excretion of porphyrins)	3,000	NCEA	6/16/2009
	Subchronic	2.0E-02	mg/m ³	NA	--	Blood effects (as evidenced by increased urinary excretion of porphyrins)	300	NCEA	6/16/2009
Trichloroethene	Chronic	N/A	--	NA	--	--	--		
	Subchronic	N/A	--	NA	--	--	--		
o-Xylene	Chronic	1.0E-01	mg/m ³	NA	--	Impaired motor coordination (decreased rotarod performance)	300	IRIS	6/22/2011
	Subchronic	4.0E-01	mg/m ³	NA	--	Impaired motor coordination	100	NCEA	9/30/2009
Vinyl chloride	Chronic	1.0E-01	mg/m ³	NA	--	Liver cell polymorphism	30	IRIS	1/25/2011
	Subchronic ¹	7.7E-02	mg/m ³	NA	--	Liver effects	30	ATSDR	12/1/2009
Benzo(a)anthracene	--	N/A	--	NA	--	--	--		
Benzo(a)pyrene	--	N/A	--	NA	--	--	--		
Benzo(b)fluoranthene	--	N/A	--	NA	--	--	--		
Benzo(g,h,i)perylene	--	N/A	--	NA	--	--	--		
Benzo(k)fluoranthene	--	N/A	--	NA	--	--	--		
1,1'-Biphenyl	--	N/A	--	NA	--	--	--		
bis(2-Ethylhexyl) phthalate	--	N/A	--	NA	--	--	--		
Dibenzo(a,h)anthracene	--	N/A	--	NA	--	--	--		
Indeno(1,2,3-cd)pyrene	--	N/A	--	NA	--	--	--		
Naphthalene	Chronic	3.0E-03	mg/m ³	NA	--	Nasal effects	3,000	IRIS	1/25/2011
Phenanthrene	--	N/A	--	NA	--	--	--		
Polychlorinated biphenyls, total	--	N/A	--	NA	--	--	--		
2,3,7,8-TCDD	--	N/A	--	NA	--	--	--		
4,4'-DDD	--	N/A	--	NA	--	--	--		
4,4'-DDE	--	N/A	--	NA	--	--	--		
4,4'-DDT	--	N/A	--	NA	--	--	--		
alpha-BHC	--	N/A	--	NA	--	--	--		
beta-BHC	--	N/A	--	NA	--	--	--		
delta-BHC	--	N/A	--	NA	--	--	--		
gamma-BHC	--	N/A	--	NA	--	--	--		
gamma-Chlordane	Chronic	7.0E-04	mg/m ³	NA	--	Liver effects	1,000	IRIS	1/25/2011
	Subchronic	7.0E-03	mg/m ³	NA	--	Liver effects	100	IRIS	1/25/2011
Dieldrin	--	N/A	--	NA	--	--	--		
Endosulfan II	--	N/A	--	NA	--	--	--		
Endosulfan sulfate	--	N/A	--	NA	--	--	--		
Endrin aldehyde	--	N/A	--	NA	--	--	--		

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic	Inhalation Reference Concentration		Extrapolated Reference Dose (RfD)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Heptachlor	--	N/A	--	NA	--	--	--		
Aluminum	Chronic	5.0E-03	mg/m ³	NA	--	Psychomotor and cognitive impairment	300	NCEA	10/23/2006
	Chronic	N/A	--	NA	--	--	--	NCEA	7/29/2008
Antimony	Subchronic	N/A	--	NA	--	--	--	NCEA	7/29/2008
Arsenic	Chronic	1.5E-05	mg/m ³	NA	--	Development, cardiovascular system, nervous system	--	CalEPA	2/1/2011
	Chronic	5.0E-04	mg/m ³	NA	--	Fetotoxicity	1,000	HEAST	7/1/1997
Barium	Subchronic	5.0E-03	mg/m ³	NA	--	Fetotoxicity	100	HEAST	7/1/1997
Cadmium	Chronic	1.0E-05	mg/m ³	NA	--	Kidney effects	9	ATSDR	12/1/2009
	Chronic	1.0E-04	mg/m ³	NA	--	Lung effects	300	IRIS	1/25/2011
Chromium (as Cr VI)	Subchronic	1.0E-03	mg/m ³	NA	--	Lung effects	30	IRIS	1/25/2011
	Chronic	6.0E-06	mg/m ³	NA	--	Lung effects	300	NCEA	8/25/2008
Cobalt	Subchronic	2.0E-05	mg/m ³	NA	--	Lung effects	100	NCEA	8/25/2008
Iron	--	N/A	--	NA	--	--	--		
Lead	--	N/A	--	NA	--	--	--		
Manganese	Chronic	5.0E-05	mg/m ³	NA	--	Neurologic effects	1,000	IRIS	1/25/2011
	Chronic	N/A	mg/m ³	NA	--	--	--	NCEA	9.30.2009
Vanadium	Subchronic	N/A	mg/m ³	NA	--	--	--	NCEA	9.30.2009

Notes

IRIS = Integrated Risk Information System (USEPA, 2011b)

NCEA = National Center for Environmental Assessment, Provisional Peer-Reviewed Toxicity Value

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

ATSDR = Agency for Toxic Substances and Disease Registry, Minimal Risk Level (ATSDR, 2009)

HEAST = Health Effects Assessment Summary Tables (USEPA, 1997a)

¹ The subchronic RfC is from a different source than the chronic RfC. The subchronic value is lower than the chronic value and will therefore not be used in the noncancer hazard calculations.

N/A = Not Available

NA = Not Applicable

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor (CSF)		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		USEPA Weight of Evidence Classification / Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Benzene	5.5E-02	(mg/kg-day) ⁻¹	1	5.5E-02	(mg/kg-day) ⁻¹	A	IRIS	1/25/2011
Bromodichloromethane	6.2E-02	(mg/kg-day) ⁻¹	1	6.2E-02	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Chlorobenzene	N/A	--	--	N/A	--	D		
Chloroform	3.1E-02	(mg/kg-day) ⁻¹	1	3.1E-02	(mg/kg-day) ⁻¹	B2	CalEPA	2/1/2011
1,2-Dibromo-3-chloropropane	8.0E-01	(mg/kg-day) ⁻¹	1	8.0E-01	(mg/kg-day) ⁻¹	Likely to be carcinogenic to humans	NCEA	8/3/2006
Dibromochloromethane	8.4E-02	(mg/kg-day) ⁻¹	1	8.4E-02	(mg/kg-day) ⁻¹	C	IRIS	1/25/2011
1,2-Dichlorobenzene	N/A	--	--	N/A	--	D		
1,3-Dichlorobenzene	N/A	--	--	N/A	--	D		
1,4-Dichlorobenzene	5.4E-03	(mg/kg-day) ⁻¹	1	5.4E-03	(mg/kg-day) ⁻¹	--	CalEPA	2/1/2011
1,1-Dichloroethane	5.7E-03	(mg/kg-day) ⁻¹	1	5.7E-03	(mg/kg-day) ⁻¹	C	CalEPA	2/1/2011
1,2-Dichloroethane	9.1E-02	(mg/kg-day) ⁻¹	1	9.1E-02	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
1,1-Dichloroethene	N/A	--	--	N/A	--	C		
cis-1,2-Dichloroethene	N/A	--	--	N/A	--	Inadequate information	NCEA	2/3/2011
trans-1,2-Dichloroethene	N/A	--	--	N/A	--	--		
Ethylbenzene	1.1E-02	(mg/kg-day) ⁻¹	1	1.1E-02	(mg/kg-day) ⁻¹	D	CalEPA	2/1/2011
Methylcyclohexane	N/A	--	--	N/A	--	--		
Methyl tert-butyl ether	1.8E-03	(mg/kg-day) ⁻¹	1	1.8E-03	(mg/kg-day) ⁻¹	--	CalEPA	2/1/2011
Methylene chloride	7.5E-03	(mg/kg-day) ⁻¹	1	7.5E-03	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Tetrachloroethene	5.4E-01	(mg/kg-day) ⁻¹	1	5.4E-01	(mg/kg-day) ⁻¹	--	CalEPA	2/1/2011
1,1,2-Trichloroethane	5.7E-02	(mg/kg-day) ⁻¹	1	5.7E-02	(mg/kg-day) ⁻¹	C	IRIS	1/25/2011
1,2,3-Trichlorobenzene	N/A	--	--	N/A	--	Inadequate information	NCEA	9/11/2009
1,2,4-Trichlorobenzene	2.9E-02	(mg/kg-day) ⁻¹	1	2.9E-02	(mg/kg-day) ⁻¹	D	NCEA	6/16/2009
Trichloroethene	5.9E-03	(mg/kg-day) ⁻¹	1	5.9E-03	(mg/kg-day) ⁻¹	--	CalEPA	2/1/2011
o-Xylene	N/A	--	--	N/A	--	Data are inadequate		
Vinyl chloride (for adult workers)	7.2E-01	(mg/kg-day) ⁻¹	1	7.2E-01	(mg/kg-day) ⁻¹	A	IRIS	1/25/2011
Vinyl chloride (for adult and child residents)	1.5E+00	(mg/kg-day) ⁻¹	1	1.5E+00	(mg/kg-day) ⁻¹			
Benzo(a)anthracene	7.3E-01	(mg/kg-day) ⁻¹	1	7.3E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Benzo(a)pyrene	7.3E+00	(mg/kg-day) ⁻¹	1	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Benzo(b)fluoranthene	7.3E-01	(mg/kg-day) ⁻¹	1	7.3E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Benzo(g,h,i)perylene	N/A	--	--	N/A	--	D	IRIS	1/25/2011
Benzo(k)fluoranthene	7.3E-02	(mg/kg-day) ⁻¹	1	7.3E-02	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
1,1-Biphenyl	N/A	--	--	N/A	--	D		
bis(2-Ethylhexyl) phthalate	1.4E-02	(mg/kg-day) ⁻¹	1	1.4E-02	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Dibenzo(a,h)anthracene	7.3E+00	(mg/kg-day) ⁻¹	1	7.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Indeno(1,2,3-cd)pyrene	7.3E-01	(mg/kg-day) ⁻¹	1	7.3E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Naphthalene	N/A	--	--	N/A	--	C		
Phenanthrene	N/A	--	--	N/A	--	D		
Polychlorinated biphenyls, total	4.0E-01	(mg/kg-day) ⁻¹	1	4.0E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
2,3,7,8-TCDD	1.6E+05	(mg/kg-day) ⁻¹	1	1.6E+05	(mg/kg-day) ⁻¹	B2	USEPA	12/30/2009

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor (CSF)		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		USEPA Weight of Evidence Classification / Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
4,4'-DDD	2.4E-01	(mg/kg-day) ⁻¹	1	2.4E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
4,4'-DDE	3.4E-01	(mg/kg-day) ⁻¹	1	3.4E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
4,4'-DDT	3.4E-01	(mg/kg-day) ⁻¹	1	3.4E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
alpha-BHC (HCH)	6.3E+00	(mg/kg-day) ⁻¹	1	6.3E+00	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
beta-BHC	1.8E+00	(mg/kg-day) ⁻¹	1	1.8E+00	(mg/kg-day) ⁻¹	C	IRIS	1/25/2011
delta-BHC	N/A	--	--	N/A	--	D		
gamma-BHC (lindane)	1.1E+00	(mg/kg-day) ⁻¹	1	1.1E+00	(mg/kg-day) ⁻¹	--	CalEPA	2/1/2011
gamma-Chlordane	3.5E-01	(mg/kg-day) ⁻¹	1	3.5E-01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Dieldrin	1.6E+01	(mg/kg-day) ⁻¹	1	1.6E+01	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Endosulfan II	N/A	--	--	N/A	--	--		
Endosulfan sulfate	N/A	--	--	N/A	--	--		
Endrin aldehyde	N/A	--	--	N/A	--	--		
Heptachlor	4.5E+00	(mg/kg-day) ⁻¹	1	4.5E+00	(mg/kg-day) ⁻¹	B2	IRIS	1/25/2011
Aluminum	N/A	--	--	N/A	--	Inadequate information	NCEA	10/23/2006
Antimony	N/A	--	--	N/A	--	Inadequate information	NCEA	8/5/2008
Arsenic	1.5E+00	(mg/kg-day)-1	1	1.5E+00	(mg/kg-day)-1	A	IRIS	1/25/2011
Barium	N/A	--	--	N/A	--	D		
Cadmium	N/A	--	--	N/A	--	B1		
Chromium (as Cr VI)	5.0E-01	(mg/kg-day)-1	0.025	2.0E+01	(mg/kg-day)-1	D	NJDEP	6/2009
Cobalt	N/A	--	--	N/A	--	--	NCEA	8/25/2008
Iron	N/A	--	--	N/A	--	--		
Lead	N/A	--	--	N/A	--	B2		
Manganese	N/A	--	--	N/A	--	D		
Vanadium	N/A	--	--	N/A	--	Inadequate information	NCEA	9/30/2009

Notes

Gastrointestinal absorption efficiencies are from Exhibit 4-1 in USEPA, 2004. See Section 4, "Toxicity Assessment," of the Human Health Risk Assessment text.

IRIS = Integrated Risk Information System (USEPA, 2011b)

NCEA = National Center for Environmental Assessment, Provisional Peer-Reviewed Toxicity Value

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

USEPA = United States Environmental Protection Agency

NJDEP = New Jersey Department of Environmental Protection (Stern, 2009)

N/A = Not Available

USEPA (1986) Weight of Evidence Classifications:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

USEPA (2005b) Cancer Guidelines Descriptions:

Carcinogenic to humans

Likely to be carcinogenic to humans

Suggestive evidence of carcinogenic potential

Inadequate information to assess carcinogenic potential

Not likely to be carcinogenic to humans

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (CSF)		USEPA Weight of Evidence Classification / Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date (MM/DD/YYYY)
Benzene	7.8E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	A	IRIS	1/25/2011
Bromodichloromethane	3.7E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Chlorobenzene	N/A	--	NA	--	D		
Chloroform	2.3E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
1,2-Dibromo-3-chloropropane	6.0E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	Likely to be carcinogenic to humans	NCEA	8/3/2006
Dibromochloromethane	2.7E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	C	CalEPA	2/1/2011
1,2-Dichlorobenzene	N/A	--	NA	--	D		
1,3-Dichlorobenzene	N/A	--	NA	--	D		
1,4-Dichlorobenzene	1.1E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	--	CalEPA	2/1/2011
1,1-Dichloroethane	1.6E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	C	CalEPA	2/1/2011
1,2-Dichloroethane	2.6E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
1,1-Dichloroethene	N/A	--	NA	--	C		
cis-1,2-Dichloroethene	N/A	--	NA	--	Inadequate information	NCEA	2/3/2011
trans-1,2-Dichloroethene	N/A	--	NA	--	--		
Ethylbenzene	2.5E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	D	CalEPA	2/1/2011
Methylcyclohexane	N/A	--	NA	--	--		
Methyl tert-butyl ether	2.6E-07	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	--	CalEPA	2/1/2011
Methylene chloride	4.7E-07	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
Tetrachloroethene	5.9E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	--	CalEPA	2/1/2011
1,1,2-Trichloroethane	1.6E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	C	IRIS	1/25/2011
1,2,3-Trichlorobenzene	N/A	--	NA	--	Inadequate information	NCEA	9/11/2009
1,2,4-Trichlorobenzene	N/A	--	NA	--	D	NCEA	6/16/2009
Trichloroethene	2.0E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	--	CalEPA	2/1/2011
o-Xylene	N/A	--	NA	--	Data are inadequate		
Vinyl chloride (for adult workers)	4.4E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--			
Vinyl chloride (for adult and child residents)	8.8E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	A	IRIS	1/25/2011

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (CSF)		USEPA Weight of Evidence Classification / Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date (MM/DD/YYYY)
Benzo(a)anthracene	1.1E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Benzo(a)pyrene	1.1E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Benzo(b)fluoranthene	1.1E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Benzo(g,h,i)perylene	N/A	--	NA	--	D		
Benzo(k)fluoranthene	1.1E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
1,1-Biphenyl	N/A	--	NA	--	D		
bis(2-Ethylhexyl) phthalate	2.4E-06	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Dibenzo(a,h)anthracene	1.2E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Indeno(1,2,3-cd)pyrene	1.1E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
Naphthalene	3.4E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	C	CalEPA	2/1/2011
Phenanthrene	N/A	--	NA	--	D		
Polychlorinated biphenyls, total	1.0E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
2,3,7,8-TCDD	3.3E+01	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	HEAST	7/1997
4,4'-DDD	6.9E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
4,4'-DDE	9.7E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	CalEPA	2/1/2011
4,4'-DDT	9.7E-05	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
alpha-BHC (HCH)	1.8E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
beta-BHC	5.3E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	C	IRIS	1/25/2011
delta-BHC	N/A	--	NA	--	D		
gamma-BHC (lindane)	3.1E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	--	CalEPA	2/1/2011
gamma-Chlordane	1.0E-04	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
Dieldrin	4.6E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011
Endosulfan II	N/A	--	NA	--	--		
Endosulfan sulfate	N/A	--	NA	--	--		
Endrin aldehyde	N/A	--	NA	--	--		
Heptachlor	1.3E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B2	IRIS	1/25/2011

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor (CSF)		USEPA Weight of Evidence Classification / Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source	Date (MM/DD/YYYY)
Aluminum	N/A	--	NA	--	Inadequate information	NCEA	10/23/2006
Antimony	N/A	--	NA	--	Inadequate information	NCEA	8/5/2008
Arsenic	4.3E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	A	IRIS	1/25/2011
Barium	N/A	--	NA	--	D		
Cadmium	1.8E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	B1	IRIS	1/25/2011
Chromium (as Cr VI)	1.2E-02	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	A	IRIS	1/25/2011
Cobalt	9.0E-03	($\mu\text{g}/\text{m}^3$) ⁻¹	NA	--	Likely to be carcinogenic to humans by the inhalation route	NCEA	8/25/2008
Iron	N/A	--	NA	--	--		
Lead	N/A	--	NA	--	B2		
Manganese	N/A	--	NA	--	D		
Vanadium	N/A	--	NA	--	Inadequate information	NCEA	9/30/2009

Notes

IRIS = Integrated Risk Information System (USEPA, 2011b)

NCEA = National Center for Environmental Assessment, Provisional Peer-Reviewed Toxicity Value

CalEPA = California Environmental Protection Agency, Office of Environmental Health Hazard Assessment

N/A = Not Available

USEPA (1986) Weight of Evidence Classifications:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as to human carcinogenicity

E - Evidence of noncarcinogenicity

USEPA (2005b) Cancer Guidelines Descriptions:

Carcinogenic to humans

Likely to be carcinogenic to humans

Suggestive evidence of carcinogenic potential

Inadequate information to assess carcinogenic potential

Not likely to be carcinogenic to humans

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Process Water	Dermal Absorption	Benzene	7.2E-04	mg/L	9.0E-07	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	5E-08	2.5E-06	mg/kg-day	4.0E-03	mg/kg-day	6E-04
				Bromodichloromethane	4.1E-04	mg/L	1.9E-07	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1E-08	5.2E-07	mg/kg-day	2.0E-02	mg/kg-day	3E-05
				Chlorobenzene	3.7E-03	mg/L	8.8E-06	mg/kg-day	NA	--	--	2.5E-05	mg/kg-day	2.0E-02	mg/kg-day	1E-03
				Chloroform	2.8E-03	mg/L	1.7E-06	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	5E-08	4.8E-06	mg/kg-day	1.0E-02	mg/kg-day	5E-04
				Dibromochloromethane	3.4E-04	mg/L	1.3E-07	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	1E-08	3.6E-07	mg/kg-day	2.0E-02	mg/kg-day	2E-05
				1,2-Dichlorobenzene	2.1E-03	mg/L	7.8E-06	mg/kg-day	NA	--	--	2.2E-05	mg/kg-day	9.0E-02	mg/kg-day	2E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	2.5E-05	mg/kg-day	NA	--	--	7.1E-05	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	1.8E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	1E-07	5.1E-05	mg/kg-day	7.0E-02	mg/kg-day	7E-04
				1,1-Dichloroethane	7.0E-04	mg/L	4.2E-07	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	2E-09	1.2E-06	mg/kg-day	2.0E-01	mg/kg-day	6E-06
				1,2-Dichloroethane	5.6E-04	mg/L	2.1E-07	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	2E-08	5.8E-07	mg/kg-day	NA	--	--
				1,1-Dichloroethene	5.7E-03	mg/L	5.8E-06	mg/kg-day	NA	--	--	1.6E-05	mg/kg-day	5.0E-02	mg/kg-day	3E-04
				cis-1,2-Dichloroethene	1.4E+01	mg/L	9.7E-03	mg/kg-day	NA	--	--	2.7E-02	mg/kg-day	2.0E-03	mg/kg-day	1E+01
				trans-1,2-Dichloroethene	6.1E-02	mg/L	4.2E-05	mg/kg-day	NA	--	--	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	6E-03
				Methyl tert-butyl ether	1.3E-02	mg/L	2.3E-06	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	4E-09	6.6E-06	mg/kg-day	NA	--	--
				Methylene chloride	5.0E-04	mg/L	1.6E-07	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	1E-09	4.4E-07	mg/kg-day	6.0E-02	mg/kg-day	7E-06
				Tetrachloroethene	3.6E-02	mg/L	1.1E-04	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	6E-05	3.1E-04	mg/kg-day	1.0E-02	mg/kg-day	3E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	5.7E-05	mg/kg-day	NA	--	--	1.6E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	3.6E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	1E-05	1.0E-03	mg/kg-day	1.0E-02	mg/kg-day	1E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	2.3E-06	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	1E-07	6.6E-06	mg/kg-day	4.0E-03	mg/kg-day	2E-03
				Trichloroethene	7.0E+00	mg/L	7.3E-03	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	4E-05	2.0E-02	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	2.6E-05	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	2E-05	7.3E-05	mg/kg-day	3.0E-03	mg/kg-day	2E-02
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	4.2E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	6E-07	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	6E-03
				Dibenzo(a,h)anthracene	1.7E-04	mg/L	2.7E-05	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-04	7.5E-05	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene	1.4E-04	mg/L	1.6E-05	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	1E-05	4.4E-05	mg/kg-day	NA	--	--
				Naphthalene	3.4E-04	mg/L	1.3E-06	mg/kg-day	NA	--	--	3.7E-06	mg/kg-day	2.0E-02	mg/kg-day	2E-04
				Total PCB Aroclors	4.4E-03	mg/L	4.0E-04	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	2E-04	1.1E-03	mg/kg-day	2.0E-05	mg/kg-day	6E+01
				gamma-Chlordane	1.1E-02	mg/L	1.2E-04	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	4E-05	3.3E-04	mg/kg-day	5.0E-04	mg/kg-day	7E-01
				4,4'-DDD	1.6E-01	mg/L	5.4E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	1E-03	1.5E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	1.4E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	5E-04	3.8E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	6.6E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-03	1.9E-02	mg/kg-day	5.0E-04	mg/kg-day	4E+01
				Heptachlor	9.7E-03	mg/L	2.2E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	1E-04	6.2E-05	mg/kg-day	5.0E-04	mg/kg-day	1E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	2.5E-09	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	4E-04	6.9E-09	mg/kg-day	1.0E-09	mg/kg-day	7E+00
				Aluminum	2.7E-01	mg/L	2.5E-05	mg/kg-day	NA	--	--	6.9E-05	mg/kg-day	1.0E+00	mg/kg-day	7E-05
				Arsenic	7.6E-02	mg/L	7.0E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-05	2.0E-05	mg/kg-day	3.0E-04	mg/kg-day	7E-02
				Barium	5.4E-01	mg/L	5.0E-05	mg/kg-day	NA	--	--	1.4E-04	mg/kg-day	1.4E-02	mg/kg-day	1E-02
				Cadmium	5.6E-04	mg/L	5.2E-08	mg/kg-day	NA	--	--	1.4E-07	mg/kg-day	2.5E-05	mg/kg-day	6E-03
				Chromium	2.3E-03	mg/L	4.2E-07	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	8E-06	1.2E-06	mg/kg-day	7.5E-05	mg/kg-day	2E-02
				Cobalt	4.2E-04	mg/L	1.5E-08	mg/kg-day	NA	--	--	4.3E-08	mg/kg-day	3.0E-04	mg/kg-day	1E-04
				Iron	5.4E-01	mg/L	5.0E-05	mg/kg-day	NA	--	--	1.4E-04	mg/kg-day	7.0E-01	mg/kg-day	2E-04
				Manganese	3.2E-01	mg/L	2.9E-05	mg/kg-day	NA	--	--	8.2E-05	mg/kg-day	9.6E-04	mg/kg-day	9E-02
				Vanadium	7.4E-03	mg/L	6.9E-07	mg/kg-day	NA	--	--	1.9E-06	mg/kg-day	1.3E-04	mg/kg-day	1E-02
Exposure Route Total											5E-03			1E+02		

TABLE 7.1.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Workplace Air	Inhalation	Benzene	1.6E+00	µg/m³	1.3E-01	µg/m³	7.8E-06	(µg/m³)⁻¹	1E-06	3.6E-01	µg/m³	3.0E+01	µg/m³	1E-02
				Bromodichloromethane	8.8E-01	µg/m³	7.2E-02	µg/m³	3.7E-05	(µg/m³)⁻¹	3E-06	2.0E-01	µg/m³	NA	--	--
				Chlorobenzene	8.0E+00	µg/m³	6.5E-01	µg/m³	NA	--	--	1.8E+00	µg/m³	5.0E+01	µg/m³	4E-02
				Chloroform	6.0E+00	µg/m³	4.9E-01	µg/m³	2.3E-05	(µg/m³)⁻¹	1E-05	1.4E+00	µg/m³	9.8E+01	µg/m³	1E-02
				Dibromochloromethane	7.4E-01	µg/m³	6.1E-02	µg/m³	2.7E-05	(µg/m³)⁻¹	2E-06	1.7E-01	µg/m³	NA	--	--
				1,2-Dichlorobenzene	4.6E+00	µg/m³	3.8E-01	µg/m³	NA	--	--	1.1E+00	µg/m³	2.0E+02	µg/m³	5E-03
				1,3-Dichlorobenzene	1.1E+01	µg/m³	9.2E-01	µg/m³	NA	--	--	2.6E+00	µg/m³	NA	--	--
				1,4-Dichlorobenzene	1.1E+01	µg/m³	8.8E-01	µg/m³	1.1E-05	(µg/m³)⁻¹	1E-05	2.5E+00	µg/m³	8.0E+02	µg/m³	3E-03
				1,1-Dichloroethane	1.5E+00	µg/m³	1.2E-01	µg/m³	1.6E-06	(µg/m³)⁻¹	2E-07	3.5E-01	µg/m³	NA	--	--
				1,2-Dichloroethane	1.2E+00	µg/m³	9.8E-02	µg/m³	2.6E-05	(µg/m³)⁻¹	3E-06	2.7E-01	µg/m³	7.0E+00	µg/m³	4E-02
				1,1-Dichloroethene	1.2E+01	µg/m³	1.0E+00	µg/m³	NA	--	--	2.8E+00	µg/m³	2.0E+02	µg/m³	1E-02
				cis-1,2-Dichloroethene	3.1E+04	µg/m³	2.5E+03	µg/m³	NA	--	--	7.0E+03	µg/m³	NA	--	--
				trans-1,2-Dichloroethene	1.3E+02	µg/m³	1.1E+01	µg/m³	NA	--	--	3.0E+01	µg/m³	6.0E+01	µg/m³	5E-01
				Methyl tert-butyl ether	2.7E+01	µg/m³	2.2E+00	µg/m³	2.6E-07	(µg/m³)⁻¹	6E-07	6.2E+00	µg/m³	3.0E+03	µg/m³	2E-03
				Methylene chloride	1.1E+00	µg/m³	8.9E-02	µg/m³	4.7E-07	(µg/m³)⁻¹	4E-08	2.5E-01	µg/m³	1.0E+03	µg/m³	2E-04
				Tetrachloroethene	7.8E+01	µg/m³	6.4E+00	µg/m³	5.9E-06	(µg/m³)⁻¹	4E-05	1.8E+01	µg/m³	2.7E+02	µg/m³	7E-02
				1,2,3-Trichlorobenzene	1.8E+01	µg/m³	1.5E+00	µg/m³	NA	--	--	4.2E+00	µg/m³	NA	--	--
				1,2,4-Trichlorobenzene	1.3E+02	µg/m³	1.0E+01	µg/m³	NA	--	--	2.9E+01	µg/m³	2.0E+00	µg/m³	1E+01
				1,1,2-Trichloroethane	8.4E+00	µg/m³	6.9E-01	µg/m³	1.6E-05	(µg/m³)⁻¹	1E-05	1.9E+00	µg/m³	NA	--	--
				Trichloroethene	1.5E+04	µg/m³	1.2E+03	µg/m³	2.0E-06	(µg/m³)⁻¹	2E-03	3.5E+03	µg/m³	NA	--	--
				Vinyl chloride	1.2E+02	µg/m³	9.4E+00	µg/m³	4.4E-06	(µg/m³)⁻¹	4E-05	2.6E+01	µg/m³	1.0E+02	µg/m³	3E-01
				Naphthalene	7.4E-01	µg/m³	6.0E-02	µg/m³	3.4E-05	(µg/m³)⁻¹	2E-06	1.7E-01	µg/m³	3.0E+00	µg/m³	6E-02
				Exposure Route Total							3E-03				2E+01	
				Exposure Point Total							8E-03				1E+02	
				Total of Receptor Risks Across Medium							8E-03				1E+02	

Notes
NA - Not Available

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Shallow Onsite Groundwater
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Subchronic																
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	Dermal Absorption	Benzene	3.0E-03	mg/L	4.0E-08	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	2E-09	1.2E-05	mg/kg-day	1.2E-02	mg/kg-day	1E-03
				Chlorobenzene	1.7E-02	mg/L	4.3E-07	mg/kg-day	NA	--	--	1.3E-04	mg/kg-day	7.0E-02	mg/kg-day	2E-03
				Chloroform	2.8E-03	mg/L	1.9E-08	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	6E-10	5.9E-06	mg/kg-day	1.0E-01	mg/kg-day	6E-05
				1,2-Dibromo-3-chloropropane	7.7E-05	mg/L	7.3E-10	mg/kg-day	8.0E-01	(mg/kg-day) ⁻¹	6E-10	2.3E-07	mg/kg-day	2.0E-03	mg/kg-day	1E-04
				Dibromochloromethane	5.5E-04	mg/L	2.2E-09	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	2E-10	6.8E-07	mg/kg-day	7.0E-02	mg/kg-day	1E-05
				1,2-Dichlorobenzene	7.2E-03	mg/L	2.8E-07	mg/kg-day	NA	--	--	8.7E-05	mg/kg-day	6.0E-01	mg/kg-day	1E-04
				1,3-Dichlorobenzene	1.4E-02	mg/L	7.3E-07	mg/kg-day	NA	--	--	2.3E-04	mg/kg-day	2.0E-02	mg/kg-day	1E-02
				1,4-Dichlorobenzene	1.9E-02	mg/L	7.4E-07	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	4E-09	2.3E-04	mg/kg-day	7.0E-02	mg/kg-day	3E-03
				1,1-Dichloroethane	2.9E-03	mg/L	1.9E-08	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	1E-10	5.8E-06	mg/kg-day	2.0E+00	mg/kg-day	3E-06
				1,2-Dichloroethane	4.6E-03	mg/L	1.8E-08	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	2E-09	5.7E-06	mg/kg-day	2.0E-02	mg/kg-day	3E-04
				1,1-Dichloroethene	6.8E-02	mg/L	7.4E-07	mg/kg-day	NA	--	--	2.3E-04	mg/kg-day	5.0E-02	mg/kg-day	5E-03
				cis-1,2-Dichloroethene	1.4E+02	mg/L	1.0E-03	mg/kg-day	NA	--	--	3.2E-01	mg/kg-day	2.0E-02	mg/kg-day	2E+01
				trans-1,2-Dichloroethene	5.8E-01	mg/L	4.2E-06	mg/kg-day	NA	--	--	1.3E-03	mg/kg-day	2.0E-01	mg/kg-day	7E-03
				Ethylbenzene	1.1E-02	mg/L	4.8E-07	mg/kg-day	1.1E-02	(mg/kg-day) ⁻¹	5E-09	1.4E-04	mg/kg-day	1.0E-01	mg/kg-day	1E-03
				Methylcyclohexane	5.9E-03	mg/L	4.8E-07	mg/kg-day	NA	--	--	1.5E-04	mg/kg-day	NA	--	--
				Methylene chloride	7.0E-03	mg/L	2.3E-08	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	2E-10	7.2E-06	mg/kg-day	6.0E-02	mg/kg-day	1E-04
				Tetrachloroethene	5.4E-01	mg/L	1.8E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	1E-05	5.5E-03	mg/kg-day	1.0E-01	mg/kg-day	6E-02
				1,2,3-Trichlorobenzene	7.4E-02	mg/L	5.3E-06	mg/kg-day	NA	--	--	1.7E-03	mg/kg-day	8.0E-03	mg/kg-day	2E-01
				1,2,4-Trichlorobenzene	1.8E-01	mg/L	1.2E-05	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	3E-07	3.6E-03	mg/kg-day	1.0E-01	mg/kg-day	4E-02
				1,1,2-Trichloroethane	1.4E-02	mg/L	8.8E-08	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	5E-09	2.8E-05	mg/kg-day	4.0E-03	mg/kg-day	7E-03
				Trichloroethene	2.3E+01	mg/L	2.6E-04	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	2E-06	8.0E-02	mg/kg-day	NA	--	--
				o-Xylene	3.8E-02	mg/L	1.5E-06	mg/kg-day	NA	--	--	4.8E-04	mg/kg-day	4.0E-01	mg/kg-day	1E-03
				Vinyl chloride	1.6E-01	mg/L	8.2E-07	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	6E-07	2.6E-04	mg/kg-day	3.0E-03	mg/kg-day	9E-02
				Benzo(a)anthracene	6.1E-04	mg/L	3.6E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	3E-07	1.1E-04	mg/kg-day	NA	--	--
				Benzo(a)pyrene	3.5E-04	mg/L	3.5E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	3E-06	1.1E-04	mg/kg-day	NA	--	--
				Benzo(b)fluoranthene	2.1E-03	mg/L	2.1E-06	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	2E-06	6.6E-04	mg/kg-day	NA	--	--
				Benzo(g,h,i)perylene	3.7E-04	mg/L	7.0E-07	mg/kg-day	NA	--	--	2.2E-04	mg/kg-day	NA	--	--
				Benzo(k)fluoranthene	7.2E-04	mg/L	7.2E-07	mg/kg-day	7.3E-02	(mg/kg-day) ⁻¹	5E-08	2.2E-04	mg/kg-day	NA	--	--
				1,1-Biphenyl	2.7E-03	mg/L	2.2E-07	mg/kg-day	NA	--	--	6.8E-05	mg/kg-day	1.0E-01	mg/kg-day	7E-04
				Dibenzo(a,h)anthracene	1.4E-03	mg/L	2.1E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-05	6.5E-04	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene	3.8E-04	mg/L	4.0E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	3E-07	1.2E-04	mg/kg-day	NA	--	--
				Naphthalene	2.0E-03	mg/L	8.2E-08	mg/kg-day	NA	--	--	2.6E-05	mg/kg-day	2.0E-01	mg/kg-day	1E-04
				Phenanthrene	5.2E-04	mg/L	6.9E-08	mg/kg-day	NA	--	--	2.2E-05	mg/kg-day	NA	--	--
				Total PCB Aroclors	1.2E-02	mg/L	1.0E-05	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	4E-06	3.2E-03	mg/kg-day	6.0E-05	mg/kg-day	5E+01
				alpha-BHC	4.9E-04	mg/L	9.7E-09	mg/kg-day	6.3E+00	(mg/kg-day) ⁻¹	6E-08	3.0E-06	mg/kg-day	8.0E-03	mg/kg-day	4E-04
				delta-BHC	1.4E-03	mg/L	4.7E-08	mg/kg-day	NA	--	--	1.5E-05	mg/kg-day	NA	--	--
				gamma-BHC	2.0E-04	mg/L	3.6E-09	mg/kg-day	1.1E+00	(mg/kg-day) ⁻¹	4E-09	1.1E-06	mg/kg-day	3.0E-03	mg/kg-day	4E-04
				gamma-Chlordane	2.2E-03	mg/L	2.3E-07	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	8E-08	7.0E-05	mg/kg-day	5.0E-04	mg/kg-day	1E-01
				4,4'-DDD	5.9E-04	mg/L	1.9E-07	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	5E-08	5.9E-05	mg/kg-day	NA	--	--
				4,4'-DDE	1.3E-03	mg/L	3.7E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	1E-07	1.2E-04	mg/kg-day	NA	--	--
				4,4'-DDT	4.4E-03	mg/L	2.3E-06	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	8E-07	7.3E-04	mg/kg-day	5.0E-04	mg/kg-day	1E+00
				Dieldrin	4.7E-04	mg/L	1.5E-08	mg/kg-day	1.6E+01	(mg/kg-day) ⁻¹	2E-07	4.7E-06	mg/kg-day	1.0E-04	mg/kg-day	5E-02
				Endosulfan II	1.1E-03	mg/L	1.3E-08	mg/kg-day	NA	--	--	3.9E-06	mg/kg-day	6.0E-03	mg/kg-day	7E-04
				Endosulfan sulfate	4.5E-04	mg/L	3.5E-09	mg/kg-day	NA	--	--	1.1E-06	mg/kg-day	NA	--	--
				Endrin aldehyde	7.7E-04	mg/L	4.5E-08	mg/kg-day	NA	--	--	1.4E-05	mg/kg-day	NA	--	--
				Heptachlor	8.7E-04	mg/L	1.9E-08	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	9E-08	6.0E-06	mg/kg-day	5.0E-04	mg/kg-day	1E-02
				2,3,7,8-TCDD Toxic Equivalence	5.4E-08	mg/L	4.9E-11	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	8E-06	1.5E-08	mg/kg-day	2.0E-08	mg/kg-day	8E-01
				Aluminum	1.8E+00	mg/L	1.6E-06	mg/kg-day	NA	--	--	5.1E-04	mg/kg-day	1.0E+00	mg/kg-day	5E-04
				Arsenic	1.4E-01	mg/L	1.2E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-07	3.9E-05	mg/kg-day	3.0E-04	mg/kg-day	1E-01
				Barium	8.2E-01	mg/L	7.3E-07	mg/kg-day	NA	--	--	2.3E-04	mg/kg-day	1.4E-02	mg/kg-day	2E-02
				Cadmium	3.3E-03	mg/L	3.0E-09	mg/kg-day	NA	--	--	9.2E-07	mg/kg-day	2.5E-05	mg/kg-day	4E-02
				Chromium	2.9E-02	mg/L	5.1E-08	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	1E-06	1.6E-05	mg/kg-day	5.0E-04	mg/kg-day	3E-02
				Cobalt	9.3E-04	mg/L	3.3E-10	mg/kg-day	NA	--	--	1.0E-07	mg/kg-day	3.0E-03	mg/kg-day	3E-05
				Iron	2.7E+00	mg/L	2.4E-06	mg/kg-day	NA	--	--	7.5E-04	mg/kg-day	7.0E-01	mg/kg-day	1E-03
				Manganese	6.7E-01	mg/L	5.9E-07	mg/kg-day	NA	--	--	1.8E-04	mg/kg-day	9.6E-04	mg/kg-day	2E-01
				Vanadium	7.8E-03	mg/L	6.9E-09	mg/kg-day	NA	--	--	2.2E-06	mg/kg-day	1.3E-04	mg/kg-day	2E-02
Exposure Route Total										5E-05					7E+01	

TABLE 7.2.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Subchronic																			
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Groundwater	Shallow Onsite Groundwater	Outdoor Air Around an Excavation	Inhalation	Benzene	4.7E-03	µg/m³	3.7E-06	µg/m³	7.8E-06	(µg/m³)⁻¹	3E-11	1.1E-03	µg/m³	9.0E+01	µg/m³	1E-05			
				Chlorobenzene	1.9E-02	µg/m³	1.6E-05	µg/m³	NA	—	—	4.6E-03	µg/m³	5.0E+02	µg/m³	9E-06			
				Chloroform	3.6E-03	µg/m³	2.8E-06	µg/m³	2.3E-05	(µg/m³)⁻¹	6E-11	8.8E-04	µg/m³	2.4E+02	µg/m³	4E-06			
				1,2-Dibromo-3-chloropropane	5.3E-05	µg/m³	4.1E-08	µg/m³	6.0E-03	(µg/m³)⁻¹	2E-10	1.3E-05	µg/m³	2.0E+00	µg/m³	6E-06			
				Dibromochloromethane	5.0E-04	µg/m³	3.9E-07	µg/m³	2.7E-05	(µg/m³)⁻¹	1E-11	1.2E-04	µg/m³	NA	—	—			
				1,2-Dichlorobenzene	8.1E-03	µg/m³	6.3E-06	µg/m³	NA	—	—	2.0E-03	µg/m³	2.0E+03	µg/m³	1E-06			
				1,3-Dichlorobenzene	1.6E-02	µg/m³	1.2E-05	µg/m³	NA	—	—	3.9E-03	µg/m³	NA	—	—			
				1,4-Dichlorobenzene	2.2E-02	µg/m³	1.7E-05	µg/m³	1.1E-05	(µg/m³)⁻¹	2E-10	5.2E-03	µg/m³	2.4E+03	µg/m³	2E-06			
				1,1-Dichloroethane	4.1E-03	µg/m³	3.2E-06	µg/m³	1.6E-06	(µg/m³)⁻¹	5E-12	9.9E-04	µg/m³	NA	—	—			
				1,2-Dichloroethane	6.1E-03	µg/m³	4.8E-06	µg/m³	2.6E-05	(µg/m³)⁻¹	1E-10	1.5E-03	µg/m³	7.0E+01	µg/m³	2E-05			
				1,1-Dichloroethene	9.7E-02	µg/m³	7.6E-05	µg/m³	NA	—	—	2.4E-02	µg/m³	2.0E+02	µg/m³	1E-04			
				cis-1,2-Dichloroethene	2.0E+02	µg/m³	1.5E-01	µg/m³	NA	—	—	4.8E+01	µg/m³	NA	—	—			
				trans-1,2-Dichloroethene	8.2E-01	µg/m³	6.4E-04	µg/m³	NA	—	—	2.0E-01	µg/m³	7.9E+02	µg/m³	3E-04			
				Ethylbenzene	1.5E-02	µg/m³	1.2E-05	µg/m³	2.5E-06	(µg/m³)⁻¹	3E-11	3.6E-03	µg/m³	9.0E+03	µg/m³	4E-07			
				Methylcyclohexane	8.3E-03	µg/m³	6.5E-06	µg/m³	NA	—	—	2.0E-03	µg/m³	3.0E+03	µg/m³	7E-07			
				Methylene chloride	1.0E-02	µg/m³	8.1E-06	µg/m³	4.7E-07	(µg/m³)⁻¹	4E-12	2.5E-03	µg/m³	1.0E+03	µg/m³	3E-06			
				Tetrachloroethene	5.8E-01	µg/m³	4.5E-04	µg/m³	5.9E-06	(µg/m³)⁻¹	3E-09	1.4E-01	µg/m³	2.7E+02	µg/m³	5E-04			
				1,2,3-Trichlorobenzene	7.4E-02	µg/m³	5.8E-05	µg/m³	NA	—	—	1.8E-02	µg/m³	NA	—	—			
				1,2,4-Trichlorobenzene	1.8E-01	µg/m³	1.4E-04	µg/m³	NA	—	—	4.4E-02	µg/m³	2.0E+01	µg/m³	2E-03			
				1,1,2-Trichloroethane	1.6E-02	µg/m³	1.2E-05	µg/m³	1.6E-05	(µg/m³)⁻¹	2E-10	3.9E-03	µg/m³	NA	—	—			
				Trichloroethene	2.8E+01	µg/m³	2.2E-02	µg/m³	2.0E-06	(µg/m³)⁻¹	4E-08	6.9E+00	µg/m³	NA	—	—			
				o-Xylene	5.1E-02	µg/m³	4.0E-05	µg/m³	NA	—	—	1.2E-02	µg/m³	4.0E+02	µg/m³	3E-05			
				Vinyl chloride	2.8E-01	µg/m³	2.2E-04	µg/m³	4.4E-06	(µg/m³)⁻¹	1E-09	6.8E-02	µg/m³	1.0E+02	µg/m³	7E-04			
				Naphthalene	2.2E-03	µg/m³	1.7E-06	µg/m³	3.4E-05	(µg/m³)⁻¹	6E-11	5.4E-04	µg/m³	3.0E+00	µg/m³	2E-04			
				Phenanthrene	2.5E-04	µg/m³	1.9E-07	µg/m³	NA	—	—	6.0E-05	µg/m³	NA	—	—			
							Exposure Route Total								5E-08				4E-03
							Exposure Point Total								5E-05				7E+01
							Total of Receptor Risks Across Medium								5E-05				7E+01

Notes
NA - Not Available

TABLE 7.3.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, SBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Dermal Absorption	Benzene	5.0E-04	mg/L	6.6E-09	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	4E-10	2.1E-06	mg/kg-day	1.2E-02	mg/kg-day	2E-04			
				Chloroform	1.1E-03	mg/L	7.3E-09	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	2E-10	2.3E-06	mg/kg-day	1.0E-01	mg/kg-day	2E-05			
				Dibromochloromethane	5.1E-04	mg/L	2.0E-09	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	2E-10	6.3E-07	mg/kg-day	7.0E-02	mg/kg-day	9E-06			
				cis-1,2-Dichloroethene	1.7E-02	mg/L	1.2E-07	mg/kg-day	NA	--	--	3.9E-05	mg/kg-day	2.0E-02	mg/kg-day	2E-03			
				Methyl tert-butyl ether	1.9E-01	mg/L	3.8E-07	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	7E-10	1.2E-04	mg/kg-day	3.0E-01	mg/kg-day	4E-04			
				Tetrachloroethene	1.9E-03	mg/L	6.3E-08	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	3E-08	2.0E-05	mg/kg-day	1.0E-01	mg/kg-day	2E-04			
				Trichloroethene	1.1E+00	mg/L	1.3E-05	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	7E-08	3.9E-03	mg/kg-day	NA	--	--			
				Dibenzo(a,h)anthracene	2.4E-03	mg/L	3.7E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	3E-05	1.2E-03	mg/kg-day	NA	--	--			
				Indeno(1,2,3-cd)pyrene	1.1E-04	mg/L	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	8E-08	3.6E-05	mg/kg-day	NA	--	--			
				Naphthalene	1.3E-04	mg/L	5.2E-09	mg/kg-day	NA	--	--	1.6E-06	mg/kg-day	2.0E-01	mg/kg-day	8E-06			
				Total PCB Aroclors	5.1E-03	mg/L	4.5E-06	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	2E-06	1.4E-03	mg/kg-day	6.0E-05	mg/kg-day	2E+01			
				2,3,7,8-TCDD Toxic Equivalence	1.7E-09	mg/L	1.5E-12	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	2E-07	4.8E-10	mg/kg-day	2.0E-08	mg/kg-day	2E-02			
				Arsenic	3.7E-02	mg/L	3.3E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5E-08	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	3E-02			
				Barium	8.3E+00	mg/L	7.3E-06	mg/kg-day	NA	--	--	2.3E-03	mg/kg-day	1.4E-02	mg/kg-day	2E-01			
				Chromium	5.7E-04	mg/L	1.0E-09	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	2E-08	3.1E-07	mg/kg-day	5.0E-04	mg/kg-day	6E-04			
				Manganese	3.2E-01	mg/L	2.9E-07	mg/kg-day	NA	--	--	8.9E-05	mg/kg-day	9.6E-04	mg/kg-day	9E-02			
				Exposure Route Total										3E-05					2E+01
				Outdoor Air Around an Excavation	Inhalation	Benzene	7.9E-04	µg/m ³	6.1E-07	µg/m ³	7.8E-06	(µg/m ³) ⁻¹	5E-12	1.9E-04	µg/m ³	9.0E+01	µg/m ³	2E-06	
						Chloroform	1.4E-03	µg/m ³	1.1E-06	µg/m ³	2.3E-05	(µg/m ³) ⁻¹	3E-11	3.4E-04	µg/m ³	2.4E+02	µg/m ³	1E-06	
		Dibromochloromethane	4.7E-04			µg/m ³	3.7E-07	µg/m ³	2.7E-05	(µg/m ³) ⁻¹	1E-11	1.1E-04	µg/m ³	NA	--	--			
		cis-1,2-Dichloroethene	2.4E-02			µg/m ³	1.9E-05	µg/m ³	NA	--	--	5.8E-03	µg/m ³	NA	--	--			
		Methyl tert-butyl ether	2.7E-01			µg/m ³	2.2E-04	µg/m ³	2.6E-07	(µg/m ³) ⁻¹	6E-11	6.7E-02	µg/m ³	3.0E+03	µg/m ³	2E-05			
		Tetrachloroethene	2.1E-03			µg/m ³	1.6E-06	µg/m ³	5.9E-06	(µg/m ³) ⁻¹	1E-11	5.0E-04	µg/m ³	2.7E+02	µg/m ³	2E-06			
		Trichloroethene	1.4E+00			µg/m ³	1.1E-03	µg/m ³	2.0E-06	(µg/m ³) ⁻¹	2E-09	3.4E-01	µg/m ³	NA	--	--			
		Naphthalene	1.4E-04			µg/m ³	1.1E-07	µg/m ³	3.4E-05	(µg/m ³) ⁻¹	4E-12	3.4E-05	µg/m ³	3.0E+00	µg/m ³	1E-05			
		Exposure Route Total										2E-09					4E-05		
		Exposure Point Total										3E-05					2E+01		
		Total of Receptor Risks Across Medium										3E-05					2E+01		

Notes
NA - Not Available

TABLE 7.4.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Subchronic																	
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Dermal Absorption	Benzene	1.2E-03	mg/L	1.6E-08	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	9E-10	5.1E-06	mg/kg-day	1.2E-02	mg/kg-day	4E-04	
				Bromodichloromethane	3.5E-04	mg/L	1.7E-09	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1E-10	5.3E-07	mg/kg-day	2.0E-02	mg/kg-day	3E-05	
				Chloroform	1.4E-03	mg/L	9.6E-09	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	3E-10	3.0E-06	mg/kg-day	1.0E-01	mg/kg-day	3E-05	
				cis-1,2-Dichloroethene	4.9E-02	mg/L	3.6E-07	mg/kg-day	NA	--	--	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	6E-03	
				Tetrachloroethene	3.8E-04	mg/L	1.2E-08	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	7E-09	3.9E-06	mg/kg-day	1.0E-01	mg/kg-day	4E-05	
				Trichloroethene	2.4E-01	mg/L	2.6E-06	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	2E-08	8.2E-04	mg/kg-day	NA	--	--	
				Vinyl chloride	3.6E-04	mg/L	1.9E-09	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	1E-09	5.8E-07	mg/kg-day	3.0E-03	mg/kg-day	2E-04	
				Benzo(g,h,i)perylene	9.8E-05	mg/L	1.8E-07	mg/kg-day	NA	--	--	5.7E-05	mg/kg-day	NA	--	--	
				bis(2-Ethylhexyl)phthalate	5.2E-03	mg/L	3.7E-07	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	5E-09	1.1E-04	mg/kg-day	2.0E-01	mg/kg-day	6E-04	
				Indeno(1,2,3-cd)pyrene	1.2E-04	mg/L	1.3E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	9E-08	4.0E-05	mg/kg-day	NA	--	--	
				Naphthalene	1.1E-04	mg/L	4.6E-09	mg/kg-day	NA	--	--	1.4E-06	mg/kg-day	2.0E-01	mg/kg-day	7E-06	
				Total PCB Aroclors	4.8E-04	mg/L	4.2E-07	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	2E-07	1.3E-04	mg/kg-day	6.0E-05	mg/kg-day	2E+00	
				beta-BHC	3.5E-04	mg/L	7.0E-09	mg/kg-day	1.8E+00	(mg/kg-day) ⁻¹	1E-08	2.2E-06	mg/kg-day	6.0E-04	mg/kg-day	4E-03	
				delta-BHC	4.2E-04	mg/L	1.4E-08	mg/kg-day	NA	--	--	4.5E-06	mg/kg-day	NA	--	--	
				4,4'-DDD	7.6E-04	mg/L	2.4E-07	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	6E-08	7.6E-05	mg/kg-day	NA	--	--	
				4,4'-DDE	7.5E-04	mg/L	2.1E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	7E-08	6.5E-05	mg/kg-day	NA	--	--	
				4,4'-DDT	9.6E-04	mg/L	5.1E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-07	1.6E-04	mg/kg-day	5.0E-04	mg/kg-day	3E-01	
				Heptachlor	2.0E-04	mg/L	4.4E-09	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	2E-08	1.4E-06	mg/kg-day	5.0E-04	mg/kg-day	3E-03	
				Antimony	2.2E-03	mg/L	1.9E-09	mg/kg-day	NA	--	--	6.1E-07	mg/kg-day	6.0E-05	mg/kg-day	1E-02	
				Arsenic	1.1E-01	mg/L	9.5E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-07	3.0E-05	mg/kg-day	3.0E-04	mg/kg-day	1E-01	
				Chromium	1.2E-03	mg/L	2.1E-09	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	4E-08	6.5E-07	mg/kg-day	5.0E-04	mg/kg-day	1E-03	
				Cobalt	4.3E-04	mg/L	1.5E-10	mg/kg-day	NA	--	--	4.8E-08	mg/kg-day	3.0E-03	mg/kg-day	2E-05	
				Manganese	5.9E-01	mg/L	5.2E-07	mg/kg-day	NA	--	--	1.6E-04	mg/kg-day	9.6E-04	mg/kg-day	2E-01	
				Vanadium	8.4E-03	mg/L	7.5E-09	mg/kg-day	NA	--	--	2.3E-06	mg/kg-day	1.3E-04	mg/kg-day	2E-02	
				Exposure Route Total										8E-07			
		Outdoor Air Around an Excavation		Inhalation	Benzene	1.9E-03	µg/m ³	1.5E-06	µg/m ³	7.8E-06	(µg/m ³) ⁻¹	1E-11	4.7E-04	µg/m ³	9.0E+01	µg/m ³	5E-06
					Bromodichloromethane	3.7E-04	µg/m ³	2.9E-07	µg/m ³	3.7E-05	(µg/m ³) ⁻¹	1E-11	9.1E-05	µg/m ³	2.0E+01	µg/m ³	5E-06
					Chloroform	1.8E-03	µg/m ³	1.4E-06	µg/m ³	2.3E-05	(µg/m ³) ⁻¹	3E-11	4.5E-04	µg/m ³	2.4E+02	µg/m ³	2E-06
					cis-1,2-Dichloroethene	6.8E-02	µg/m ³	5.3E-05	µg/m ³	NA	--	--	1.7E-02	µg/m ³	NA	--	--
					Tetrachloroethene	4.1E-04	µg/m ³	3.2E-07	µg/m ³	5.9E-06	(µg/m ³) ⁻¹	2E-12	9.9E-05	µg/m ³	2.7E+02	µg/m ³	4E-07
					Trichloroethene	2.9E-01	µg/m ³	2.3E-04	µg/m ³	2.0E-06	(µg/m ³) ⁻¹	5E-10	7.1E-02	µg/m ³	NA	--	--
					Vinyl chloride	6.4E-04	µg/m ³	5.0E-07	µg/m ³	4.4E-06	(µg/m ³) ⁻¹	2E-12	1.6E-04	µg/m ³	1.0E+02	µg/m ³	2E-06
					Naphthalene	1.3E-04	µg/m ³	9.9E-08	µg/m ³	3.4E-05	(µg/m ³) ⁻¹	3E-12	3.1E-05	µg/m ³	3.0E+00	µg/m ³	1E-05
				Exposure Route Total										5E-10			
		Exposure Point Total										8E-07					3E+00
		Total of Receptor Risks Across Medium										8E-07					3E+00

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Tap Water	Ingestion	Benzene	7.2E-04	mg/L	6.8E-06	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	6E-07	2.0E-05	mg/kg-day	4.0E-03	mg/kg-day	5E-03
				Bromodichloromethane	4.1E-04	mg/L	3.8E-06	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	4E-07	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	6E-04
				Chlorobenzene	3.7E-03	mg/L	3.5E-05	mg/kg-day	NA	—	—	1.0E-04	mg/kg-day	2.0E-02	mg/kg-day	5E-03
				Chloroform	2.8E-03	mg/L	2.6E-05	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	1E-06	7.6E-05	mg/kg-day	1.0E-02	mg/kg-day	8E-03
				Dibromochloromethane	3.4E-04	mg/L	3.2E-06	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	4E-07	9.4E-06	mg/kg-day	2.0E-02	mg/kg-day	5E-04
				1,2-Dichlorobenzene	2.1E-03	mg/L	2.0E-05	mg/kg-day	NA	—	—	5.9E-05	mg/kg-day	9.0E-02	mg/kg-day	7E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	4.9E-05	mg/kg-day	NA	—	—	1.4E-04	mg/kg-day	NA	—	—
				1,4-Dichlorobenzene	5.0E-03	mg/L	4.7E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	4E-07	1.4E-04	mg/kg-day	7.0E-02	mg/kg-day	2E-03
				1,1-Dichloroethane	7.0E-04	mg/L	6.6E-06	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	6E-08	1.9E-05	mg/kg-day	2.0E-01	mg/kg-day	1E-04
				1,2-Dichloroethane	5.6E-04	mg/L	5.2E-06	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	8E-07	1.5E-05	mg/kg-day	NA	—	—
				1,1-Dichloroethene	5.7E-03	mg/L	5.4E-05	mg/kg-day	NA	—	—	1.6E-04	mg/kg-day	5.0E-02	mg/kg-day	3E-03
				cis-1,2-Dichloroethene	1.4E+01	mg/L	1.3E-01	mg/kg-day	NA	—	—	3.9E-01	mg/kg-day	2.0E-03	mg/kg-day	2E+02
				trans-1,2-Dichloroethene	6.1E-02	mg/L	5.7E-04	mg/kg-day	NA	—	—	1.7E-03	mg/kg-day	2.0E-02	mg/kg-day	8E-02
				Methyl tert-butyl ether	1.3E-02	mg/L	1.2E-04	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	3E-07	3.4E-04	mg/kg-day	NA	—	—
				Methylene chloride	5.0E-04	mg/L	4.7E-06	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	6E-08	1.4E-05	mg/kg-day	6.0E-02	mg/kg-day	2E-04
				Tetrachloroethene	3.6E-02	mg/L	3.4E-04	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	3E-04	9.9E-04	mg/kg-day	1.0E-02	mg/kg-day	1E-01
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	7.9E-05	mg/kg-day	NA	—	—	2.3E-04	mg/kg-day	NA	—	—
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	5.5E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	3E-05	1.6E-03	mg/kg-day	1.0E-02	mg/kg-day	2E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	3.7E-05	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	3E-06	1.1E-04	mg/kg-day	4.0E-03	mg/kg-day	3E-02
				Trichloroethene	7.0E+00	mg/L	6.6E-02	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	6E-04	1.9E-01	mg/kg-day	NA	—	—
				Vinyl chloride	5.3E-02	mg/L	5.0E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-03	1.5E-03	mg/kg-day	3.0E-03	mg/kg-day	5E-01
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	5.4E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	1E-06	1.6E-04	mg/kg-day	2.0E-02	mg/kg-day	8E-03
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	3E-07	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	2E-05	4.5E-06	mg/kg-day	NA	—	—
							1E-07	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	3E-06					
							1E-07	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	3E-06					
							6E-08	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	5E-07					
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	2E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-06	3.9E-06	mg/kg-day	NA	—	—
							1E-07	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	3E-07					
							1E-07	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	2E-07					
							6E-08	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	4E-08					
				Naphthalene	3.4E-04	mg/L	3.2E-06	mg/kg-day	NA	—	—	9.3E-06	mg/kg-day	2.0E-02	mg/kg-day	5E-04
				Total PCB Aroclors	4.4E-03	mg/L	4.2E-05	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	3E-05	1.2E-04	mg/kg-day	2.0E-05	mg/kg-day	6E+00
				gamma-Chlordane	1.1E-02	mg/L	1.0E-04	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	6E-05	2.9E-04	mg/kg-day	5.0E-04	mg/kg-day	6E-01
				4,4'-DDD	1.6E-01	mg/L	1.5E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	6E-04	4.4E-03	mg/kg-day	NA	—	—
				4,4'-DDE	4.8E-02	mg/L	4.5E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-04	1.3E-03	mg/kg-day	NA	—	—
				4,4'-DDT	1.2E-01	mg/L	1.1E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	6E-04	3.3E-03	mg/kg-day	5.0E-04	mg/kg-day	7E+00
				Heptachlor	9.7E-03	mg/L	9.1E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	6E-04	2.6E-04	mg/kg-day	5.0E-04	mg/kg-day	5E-01
				2,3,7,8-TCDD Toxic Equivalence	2.8E-08	mg/L	2.5E-10	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	6E-05	7.2E-10	mg/kg-day	1.0E-09	mg/kg-day	7E-01
				Aluminum	2.7E-01	mg/L	2.5E-03	mg/kg-day	NA	—	—	7.3E-03	mg/kg-day	1.0E+00	mg/kg-day	7E-03
				Arsenic	7.6E-02	mg/L	7.1E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-03	2.1E-03	mg/kg-day	3.0E-04	mg/kg-day	7E+00
				Barium	5.4E-01	mg/L	5.1E-03	mg/kg-day	NA	—	—	1.5E-02	mg/kg-day	2.0E-01	mg/kg-day	7E-02
				Cadmium	5.6E-04	mg/L	5.3E-06	mg/kg-day	NA	—	—	1.5E-05	mg/kg-day	5.0E-04	mg/kg-day	3E-02
				Chromium ^	2.3E-03	mg/L	3.6E-06	mg/kg-day	5.0E+00	(mg/kg-day) ⁻¹	2E-05	6.2E-05	mg/kg-day	3.0E-03	mg/kg-day	2E-02
							1.9E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3E-06					
							1.6E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-06					
							8.7E-07	mg/kg-day	5.0E-01	(mg/kg-day) ⁻¹	4E-07					
				Cobalt	4.2E-04	mg/L	3.9E-06	mg/kg-day	NA	—	—	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	4E-02
				Iron	5.4E-01	mg/L	5.0E-03	mg/kg-day	NA	—	—	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	2E-02
				Manganese	3.2E-01	mg/L	3.0E-03	mg/kg-day	NA	—	—	8.7E-03	mg/kg-day	2.4E-02	mg/kg-day	4E-01
				Vanadium	7.4E-03	mg/L	7.0E-05	mg/kg-day	NA	—	—	2.0E-04	mg/kg-day	5.0E-03	mg/kg-day	4E-02
Exposure Route Total										6E-03					2E+02	

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Shower	Dermal Absorption	Benzene	7.2E-04	mg/L	N/A	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Bromodichloromethane	4.1E-04	mg/L	N/A	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Chlorobenzene	3.7E-03	mg/L	7.3E-06	mg/kg-day	NA	—	—	2.1E-05	mg/kg-day	2.0E-02	mg/kg-day	1E-03
				Chloroform	2.8E-03	mg/L	N/A	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	1.0E-02	mg/kg-day	N/A
				Dibromochloromethane	3.4E-04	mg/L	N/A	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				1,2-Dichlorobenzene	2.1E-03	mg/L	7.8E-06	mg/kg-day	NA	—	—	2.3E-05	mg/kg-day	9.0E-02	mg/kg-day	3E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	2.7E-05	mg/kg-day	NA	—	—	7.8E-05	mg/kg-day	NA	—	—
				1,4-Dichlorobenzene	5.0E-03	mg/L	1.9E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	2E-07	5.4E-05	mg/kg-day	7.0E-02	mg/kg-day	8E-04
				1,1-Dichloroethane	7.0E-04	mg/L	N/A	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-01	mg/kg-day	N/A
				1,2-Dichloroethane	5.6E-04	mg/L	N/A	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	—	N/A
				1,1-Dichloroethene	5.7E-03	mg/L	N/A	mg/kg-day	NA	—	N/A	N/A	mg/kg-day	5.0E-02	mg/kg-day	N/A
				cis-1,2-Dichloroethene	1.4E+01	mg/L	N/A	mg/kg-day	NA	—	N/A	N/A	mg/kg-day	2.0E-03	mg/kg-day	N/A
				trans-1,2-Dichloroethene	6.1E-02	mg/L	N/A	mg/kg-day	NA	—	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Methyl tert-butyl ether	1.3E-02	mg/L	N/A	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	—	N/A
				Methylene chloride	5.0E-04	mg/L	N/A	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	6.0E-02	mg/kg-day	N/A
				Tetrachloroethene	3.6E-02	mg/L	1.2E-04	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	1E-04	3.5E-04	mg/kg-day	1.0E-02	mg/kg-day	4E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	7.1E-05	mg/kg-day	NA	—	—	2.1E-04	mg/kg-day	NA	—	—
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	4.3E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	2E-05	1.3E-03	mg/kg-day	1.0E-02	mg/kg-day	1E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	N/A	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Trichloroethene	7.0E+00	mg/L	6.4E-03	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	6E-05	1.9E-02	mg/kg-day	NA	—	—
				Vinyl chloride	5.3E-02	mg/L	N/A	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	3.0E-03	mg/kg-day	N/A
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	5.3E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	1E-06	1.6E-04	mg/kg-day	2.0E-02	mg/kg-day	8E-03
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	2.8E-06	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	2E-04	1.0E-04	mg/kg-day	NA	—	—
							2.4E-06	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	5E-05					
							1.8E-06	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	4E-05					
							1.4E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	1E-05					
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	1.7E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	1E-05	6.0E-05	mg/kg-day	NA	—	—
							1.4E-06	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	3E-06					
							1.1E-06	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	2E-06					
							8.5E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	6E-07					
				Naphthalene	3.4E-04	mg/L	1.2E-06	mg/kg-day	NA	—	—	3.6E-06	mg/kg-day	2.0E-02	mg/kg-day	2E-04
				Total PCB Aroclors	4.4E-03	mg/L	5.2E-04	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	3E-04	1.5E-03	mg/kg-day	2.0E-05	mg/kg-day	8E+01
				gamma-Chlordane	1.1E-02	mg/L	1.5E-04	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	8E-05	4.5E-04	mg/kg-day	5.0E-04	mg/kg-day	9E-01
				4,4'-DDD	1.6E-01	mg/L	6.9E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	3E-03	2.0E-02	mg/kg-day	NA	—	—
				4,4'-DDE	4.8E-02	mg/L	1.8E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	9E-04	5.2E-03	mg/kg-day	NA	—	—
				4,4'-DDT	1.2E-01	mg/L	8.5E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	5E-03	2.5E-02	mg/kg-day	5.0E-04	mg/kg-day	5E+01
				Heptachlor	9.7E-03	mg/L	2.9E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	2E-04	8.3E-05	mg/kg-day	5.0E-04	mg/kg-day	2E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	3.3E-09	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	8E-04	9.7E-09	mg/kg-day	1.0E-09	mg/kg-day	1E+01
				Aluminum	2.7E-01	mg/L	5.7E-06	mg/kg-day	NA	—	—	1.7E-05	mg/kg-day	1.0E+00	mg/kg-day	2E-05
				Arsenic	7.6E-02	mg/L	1.6E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4E-06	4.7E-06	mg/kg-day	3.0E-04	mg/kg-day	2E-02
				Barium	5.4E-01	mg/L	1.1E-05	mg/kg-day	NA	—	—	3.4E-05	mg/kg-day	1.4E-02	mg/kg-day	2E-03
				Cadmium	5.6E-04	mg/L	1.2E-08	mg/kg-day	NA	—	—	3.5E-08	mg/kg-day	2.5E-05	mg/kg-day	1E-03
				Chromium ^	2.3E-03	mg/L	7.7E-09	mg/kg-day	2.0E+02	(mg/kg-day) ⁻¹	2E-06	2.8E-07	mg/kg-day	7.5E-05	mg/kg-day	4E-03
							6.6E-09		6.0E+01		4E-07					
							4.9E-09		6.0E+01		3E-07					
							3.9E-09		2.0E+01		8E-08					
				Cobalt	4.2E-04	mg/L	3.5E-09	mg/kg-day	NA	—	—	1.0E-08	mg/kg-day	3.0E-04	mg/kg-day	3E-05
				Iron	5.4E-01	mg/L	1.1E-05	mg/kg-day	NA	—	—	3.3E-05	mg/kg-day	7.0E-01	mg/kg-day	5E-05
				Manganese	3.2E-01	mg/L	6.7E-06	mg/kg-day	NA	—	—	2.0E-05	mg/kg-day	9.6E-04	mg/kg-day	2E-02
				Vanadium	7.4E-03	mg/L	1.6E-07	mg/kg-day	NA	—	—	4.6E-07	mg/kg-day	1.3E-04	mg/kg-day	4E-03
Exposure Route Total										1E-02					1E+02	

TABLE 7.5.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Groundwater	Entire Aquifer	Bathroom Air	Inhalation	Benzene	4.0E+00	µg/m³	3.2E-02	µg/m³	7.8E-06	(µg/m³)⁻¹	4E-07	9.2E-02	µg/m³	3.0E+01	µg/m³	3E-03		
				Bromodichloromethane	2.2E+00	µg/m³	1.8E-02	µg/m³	3.7E-05	(µg/m³)⁻¹	1E-06	5.2E-02	µg/m³	NA	—	—		
				Chlorobenzene	2.0E+01	µg/m³	1.6E-01	µg/m³	NA	—	—	4.7E-01	µg/m³	5.0E+01	µg/m³	9E-03		
				Chloroform	1.5E+01	µg/m³	1.2E-01	µg/m³	2.3E-05	(µg/m³)⁻¹	5E-06	3.5E-01	µg/m³	9.8E+01	µg/m³	4E-03		
				Dibromochloromethane	1.9E+00	µg/m³	1.5E-02	µg/m³	2.7E-05	(µg/m³)⁻¹	7E-07	4.4E-02	µg/m³	NA	—	—		
				1,2-Dichlorobenzene	1.2E+01	µg/m³	9.4E-02	µg/m³	NA	—	—	2.7E-01	µg/m³	2.0E+02	µg/m³	1E-03		
				1,3-Dichlorobenzene	2.9E+01	µg/m³	2.3E-01	µg/m³	NA	—	—	6.7E-01	µg/m³	NA	—	—		
				1,4-Dichlorobenzene	2.8E+01	µg/m³	2.2E-01	µg/m³	1.1E-05	(µg/m³)⁻¹	4E-06	6.4E-01	µg/m³	8.0E+02	µg/m³	8E-04		
				1,1-Dichloroethane	3.9E+00	µg/m³	3.1E-02	µg/m³	1.6E-06	(µg/m³)⁻¹	9E-08	8.9E-02	µg/m³	NA	—	—		
				1,2-Dichloroethane	3.1E+00	µg/m³	2.4E-02	µg/m³	2.6E-05	(µg/m³)⁻¹	1E-06	7.1E-02	µg/m³	7.0E+00	µg/m³	1E-02		
				1,1-Dichloroethene	3.2E+01	µg/m³	2.5E-01	µg/m³	NA	—	—	7.3E-01	µg/m³	2.0E+02	µg/m³	4E-03		
				cis-1,2-Dichloroethene	7.8E+04	µg/m³	6.2E+02	µg/m³	NA	—	—	1.8E+03	µg/m³	NA	—	—		
				trans-1,2-Dichloroethene	3.4E+02	µg/m³	2.7E+00	µg/m³	NA	—	—	7.8E+00	µg/m³	6.0E+01	µg/m³	1E-01		
				Methyl tert-butyl ether	6.9E+01	µg/m³	5.5E-01	µg/m³	2.6E-07	(µg/m³)⁻¹	3E-07	1.6E+00	µg/m³	3.0E+03	µg/m³	5E-04		
				Methylene chloride	2.8E+00	µg/m³	2.2E-02	µg/m³	4.7E-07	(µg/m³)⁻¹	2E-08	6.4E-02	µg/m³	1.0E+03	µg/m³	6E-05		
				Tetrachloroethene	2.0E+02	µg/m³	1.6E+00	µg/m³	5.9E-06	(µg/m³)⁻¹	2E-05	4.6E+00	µg/m³	2.7E+02	µg/m³	2E-02		
				1,2,3-Trichlorobenzene	4.7E+01	µg/m³	3.7E-01	µg/m³	NA	—	—	1.1E+00	µg/m³	NA	—	—		
				1,2,4-Trichlorobenzene	3.2E+02	µg/m³	2.6E+00	µg/m³	NA	—	—	7.5E+00	µg/m³	2.0E+00	µg/m³	4E+00		
				1,1,2-Trichloroethane	2.2E+01	µg/m³	1.7E-01	µg/m³	1.6E-05	(µg/m³)⁻¹	5E-06	5.0E-01	µg/m³	NA	—	—		
				Trichloroethene	3.9E+04	µg/m³	3.1E+02	µg/m³	2.0E-06	(µg/m³)⁻¹	1E-03	9.0E+02	µg/m³	NA	—	—		
				Vinyl chloride	2.9E+02	µg/m³	2.3E+00	µg/m³	8.8E-06	(µg/m³)⁻¹	4E-05	6.8E+00	µg/m³	1.0E+02	µg/m³	7E-02		
				Naphthalene	1.9E+00	µg/m³	1.5E-02	µg/m³	3.4E-05	(µg/m³)⁻¹	9E-07	4.4E-02	µg/m³	3.0E+00	µg/m³	1E-02		
								Exposure Route Total							1E-03			4E+00
								Exposure Point Total							2E-02			4E+02
								Total of Receptor Risks Across Medium							2E-02			4E+02

Notes

Cancer risks for the resident adult were calculated as 6 years at the child's rate of exposure and 24 years at the adult's rate of exposure.

^ To calculate cancer risks for these carcinogenic COPCs with a mutagenic mode of action, age-dependent adjustment factors (ADAF) were applied to the cancer slope factors. For the resident adult, an ADAF of 10 was used to evaluate exposure between the ages of 0-2; an ADAF of 3 was used to evaluate exposure between the ages of 2-6 and 6-16; no adjustment was made to evaluate exposure between the ages of 16-30. To facilitate application of the ADAFs, intakes and dermally absorbed doses were calculated for each of the corresponding age groups, and the appropriate ADAF was applied to the cancer slope factor.

N/A - Not Applicable

NA - Not Available

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Tap Water	Ingestion	Benzene	7.2E-04	mg/L	4E-06	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	2E-07	5E-05	mg/kg-day	4.0E-03	mg/kg-day	1E-02
				Bromodichloromethane	4.1E-04	mg/L	2E-06	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1E-07	3E-05	mg/kg-day	2.0E-02	mg/kg-day	1E-03
				Chlorobenzene	3.7E-03	mg/L	2E-05	mg/kg-day	NA	--	--	2E-04	mg/kg-day	2.0E-02	mg/kg-day	1E-02
				Chloroform	2.8E-03	mg/L	2E-05	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	5E-07	2E-04	mg/kg-day	1.0E-02	mg/kg-day	2E-02
				Dibromochloromethane	3.4E-04	mg/L	2E-06	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	2E-07	2E-05	mg/kg-day	2.0E-02	mg/kg-day	1E-03
				1,2-Dichlorobenzene	2.1E-03	mg/L	1E-05	mg/kg-day	NA	--	--	1E-04	mg/kg-day	9.0E-02	mg/kg-day	2E-03
				1,3-Dichlorobenzene	5.2E-03	mg/L	3E-05	mg/kg-day	NA	--	--	3E-04	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	3E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	1E-07	3E-04	mg/kg-day	7.0E-02	mg/kg-day	5E-03
				1,1-Dichloroethane	7.0E-04	mg/L	4E-06	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	2E-08	4E-05	mg/kg-day	2.0E-01	mg/kg-day	2E-04
				1,2-Dichloroethane	5.6E-04	mg/L	3E-06	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	3E-07	4E-05	mg/kg-day	NA	--	--
				1,1-Dichloroethene	5.7E-03	mg/L	3E-05	mg/kg-day	NA	--	--	4E-04	mg/kg-day	5.0E-02	mg/kg-day	7E-03
				cis-1,2-Dichloroethene	1.4E+01	mg/L	8E-02	mg/kg-day	NA	--	--	9E-01	mg/kg-day	2.0E-03	mg/kg-day	5E+02
				trans-1,2-Dichloroethene	6.1E-02	mg/L	3E-04	mg/kg-day	NA	--	--	4E-03	mg/kg-day	2.0E-02	mg/kg-day	2E-01
				Methyl tert-butyl ether	1.3E-02	mg/L	7E-05	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	1E-07	8E-04	mg/kg-day	NA	--	--
				Methylene chloride	5.0E-04	mg/L	3E-06	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	2E-08	3E-05	mg/kg-day	6.0E-02	mg/kg-day	5E-04
				Tetrachloroethene	3.6E-02	mg/L	2E-04	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	1E-04	2E-03	mg/kg-day	1.0E-02	mg/kg-day	2E-01
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	5E-05	mg/kg-day	NA	--	--	5E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	3E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	9E-06	4E-03	mg/kg-day	1.0E-02	mg/kg-day	4E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	2E-05	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	1E-06	2E-04	mg/kg-day	4.0E-03	mg/kg-day	6E-02
				Trichloroethene	7.0E+00	mg/L	4E-02	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	2E-04	5E-01	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	3E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4E-04	3E-03	mg/kg-day	3.0E-03	mg/kg-day	1E+00
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	3E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	4E-07	4E-04	mg/kg-day	2.0E-02	mg/kg-day	2E-02
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	3E-07	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	2E-05	1E-05	mg/kg-day	NA	--	--
							1E-07	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	3E-06					
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	2E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-06	9E-06	mg/kg-day	NA	--	--
							1E-07	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	3E-07					
				Naphthalene	3.4E-04	mg/L	2E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	2.0E-02	mg/kg-day	1E-03
				Total PCB Aroclors	4.4E-03	mg/L	2E-05	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	1E-05	3E-04	mg/kg-day	2.0E-05	mg/kg-day	1E+01
				gamma-Chlordane	1.1E-02	mg/L	6E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	2E-05	7E-04	mg/kg-day	5.0E-04	mg/kg-day	1E+00
				4,4'-DDD	1.6E-01	mg/L	9E-04	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	2E-04	1E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	3E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	9E-05	3E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	7E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-04	8E-03	mg/kg-day	5.0E-04	mg/kg-day	2E+01
				Heptachlor	9.7E-03	mg/L	5E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	2E-04	6E-04	mg/kg-day	5.0E-04	mg/kg-day	1E+00
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	1E-10	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	2E-05	2E-09	mg/kg-day	1.0E-09	mg/kg-day	2E+00
				Aluminum	2.7E-01	mg/L	1E-03	mg/kg-day	NA	--	--	2E-02	mg/kg-day	1.0E+00	mg/kg-day	2E-02
				Arsenic	7.6E-02	mg/L	4E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	6E-04	5E-03	mg/kg-day	3.0E-04	mg/kg-day	2E+01
				Barium	5.4E-01	mg/L	3E-03	mg/kg-day	NA	--	--	3E-02	mg/kg-day	2.0E-01	mg/kg-day	2E-01
				Cadmium	5.6E-04	mg/L	3E-06	mg/kg-day	NA	--	--	4E-05	mg/kg-day	5.0E-04	mg/kg-day	7E-02
				Chromium ^	2.3E-03	mg/L	4E-06	mg/kg-day	5.0E+00	(mg/kg-day) ⁻¹	2E-05	1E-04	mg/kg-day	3.0E-03	mg/kg-day	5E-02
							2E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3E-06					
				Cobalt	4.2E-04	mg/L	2E-06	mg/kg-day	NA	--	--	3E-05	mg/kg-day	3.0E-04	mg/kg-day	9E-02
				Iron	5.4E-01	mg/L	3E-03	mg/kg-day	NA	--	--	3E-02	mg/kg-day	7.0E-01	mg/kg-day	5E-02
				Manganese	3.2E-01	mg/L	2E-03	mg/kg-day	NA	--	--	2E-02	mg/kg-day	2.4E-02	mg/kg-day	8E-01
				Vanadium	7.4E-03	mg/L	4E-05	mg/kg-day	NA	--	--	5E-04	mg/kg-day	5.0E-03	mg/kg-day	9E-02
Exposure Route Total										2E-03					5E+02	

TABLE 7.6.RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Shower	Dermal Absorption	Benzene	7.2E-04	mg/L	N/A	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Bromodichloromethane	4.1E-04	mg/L	N/A	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Chlorobenzene	3.7E-03	mg/L	4E-06	mg/kg-day	NA	--	--	5E-05	mg/kg-day	2.0E-02	mg/kg-day	2E-03
				Chloroform	2.8E-03	mg/L	N/A	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	1.0E-02	mg/kg-day	N/A
				Dibromochloromethane	3.4E-04	mg/L	N/A	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				1,2-Dichlorobenzene	2.1E-03	mg/L	5E-06	mg/kg-day	NA	--	--	5E-05	mg/kg-day	9.0E-02	mg/kg-day	6E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	2E-05	mg/kg-day	NA	--	--	2E-04	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	1E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	6E-08	1E-04	mg/kg-day	7.0E-02	mg/kg-day	2E-03
				1,1-Dichloroethane	7.0E-04	mg/L	N/A	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-01	mg/kg-day	N/A
				1,2-Dichloroethane	5.6E-04	mg/L	N/A	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				1,1-Dichloroethene	5.7E-03	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	5.0E-02	mg/kg-day	N/A
				cis-1,2-Dichloroethene	1.4E+01	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-03	mg/kg-day	N/A
				trans-1,2-Dichloroethene	6.1E-02	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Methyl tert-butyl ether	1.3E-02	mg/L	N/A	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				Methylene chloride	5.0E-04	mg/L	N/A	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	6.0E-02	mg/kg-day	N/A
				Tetrachloroethene	3.6E-02	mg/L	7E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	4E-05	8E-04	mg/kg-day	1.0E-02	mg/kg-day	8E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	4E-05	mg/kg-day	NA	--	--	4E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	2E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	7E-06	3E-03	mg/kg-day	1.0E-02	mg/kg-day	3E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	N/A	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Trichloroethene	7.0E+00	mg/L	4E-03	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	2E-05	4E-02	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	N/A	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	3.0E-03	mg/kg-day	N/A
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	3E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	4E-07	4E-04	mg/kg-day	2.0E-02	mg/kg-day	2E-02
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	4E-06	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	3E-04	2E-04	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	3E-06	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	7E-05	1E-04	mg/kg-day	NA	--	--
							2E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-05					
							2E-06	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	4E-06					
				Naphthalene	3.4E-04	mg/L	7E-07	mg/kg-day	NA	--	--	8E-06	mg/kg-day	2.0E-02	mg/kg-day	4E-04
				Total PCB Aroclors	4.4E-03	mg/L	3E-04	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	1E-04	4E-03	mg/kg-day	2.0E-05	mg/kg-day	2E+02
				gamma-Chlordane	1.1E-02	mg/L	9E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	3E-05	1E-03	mg/kg-day	5.0E-04	mg/kg-day	2E+00
				4,4'-DDD	1.6E-01	mg/L	4E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	1E-03	5E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	1E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	3E-04	1E-02	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	5E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-03	6E-02	mg/kg-day	5.0E-04	mg/kg-day	1E+02
				Heptachlor	9.7E-03	mg/L	2E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	7E-05	2E-04	mg/kg-day	5.0E-04	mg/kg-day	4E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	2E-09	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	3E-04	2E-08	mg/kg-day	1.0E-09	mg/kg-day	2E+01
				Aluminum	2.7E-01	mg/L	4E-06	mg/kg-day	NA	--	--	5E-05	mg/kg-day	1.0E+00	mg/kg-day	5E-05
				Arsenic	7.6E-02	mg/L	1E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-06	1E-05	mg/kg-day	3.0E-04	mg/kg-day	5E-02
				Barium	5.4E-01	mg/L	9E-06	mg/kg-day	NA	--	--	1E-04	mg/kg-day	1.4E-02	mg/kg-day	7E-03
				Cadmium	5.6E-04	mg/L	9E-09	mg/kg-day	NA	--	--	1E-07	mg/kg-day	2.5E-05	mg/kg-day	4E-03
				Chromium ^	2.3E-03	mg/L	1E-08	mg/kg-day	2.0E+02	(mg/kg-day) ⁻¹	3E-06	9E-07	mg/kg-day	7.5E-05	mg/kg-day	1E-02
							1E-08		6.0E+01		7E-07					
				Cobalt	4.2E-04	mg/L	3E-09	mg/kg-day	NA	--	--	3E-08	mg/kg-day	3.0E-04	mg/kg-day	1E-04
				Iron	5.4E-01	mg/L	9E-06	mg/kg-day	NA	--	--	1E-04	mg/kg-day	7.0E-01	mg/kg-day	1E-04
				Manganese	3.2E-01	mg/L	5E-06	mg/kg-day	NA	--	--	6E-05	mg/kg-day	9.6E-04	mg/kg-day	6E-02
				Vanadium	7.4E-03	mg/L	1E-07	mg/kg-day	NA	--	--	1E-06	mg/kg-day	1.3E-04	mg/kg-day	1E-02
Exposure Route Total									4E-03						3E+02	

TABLE 7.6 RME
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Bathroom Air	Inhalation	Benzene	7.1E+00	µg/m ³	2E-02	µg/m ³	7.8E-06	(µg/m ³) ⁻¹	2E-07	3E-01	µg/m ³	3.0E+01	µg/m ³	9E-03
				Bromodichloromethane	4.0E+00	µg/m ³	1E-02	µg/m ³	3.7E-05	(µg/m ³) ⁻¹	5E-07	2E-01	µg/m ³	NA	—	—
				Chlorobenzene	3.6E+01	µg/m ³	1E-01	µg/m ³	NA	—	—	1E+00	µg/m ³	5.0E+01	µg/m ³	3E-02
				Chloroform	2.7E+01	µg/m ³	9E-02	µg/m ³	2.3E-05	(µg/m ³) ⁻¹	2E-06	1E+00	µg/m ³	9.8E+01	µg/m ³	1E-02
				Dibromochloromethane	3.4E+00	µg/m ³	1E-02	µg/m ³	2.7E-05	(µg/m ³) ⁻¹	3E-07	1E-01	µg/m ³	NA	—	—
				1,2-Dichlorobenzene	2.1E+01	µg/m ³	7E-02	µg/m ³	NA	—	—	8E-01	µg/m ³	2.0E+02	µg/m ³	4E-03
				1,3-Dichlorobenzene	5.1E+01	µg/m ³	2E-01	µg/m ³	NA	—	—	2E+00	µg/m ³	NA	—	—
				1,4-Dichlorobenzene	4.9E+01	µg/m ³	2E-01	µg/m ³	1.1E-05	(µg/m ³) ⁻¹	2E-06	2E+00	µg/m ³	8.0E+02	µg/m ³	2E-03
				1,1-Dichloroethane	6.9E+00	µg/m ³	2E-02	µg/m ³	1.6E-06	(µg/m ³) ⁻¹	4E-08	3E-01	µg/m ³	NA	—	—
				1,2-Dichloroethane	5.4E+00	µg/m ³	2E-02	µg/m ³	2.6E-05	(µg/m ³) ⁻¹	5E-07	2E-01	µg/m ³	7.0E+00	µg/m ³	3E-02
				1,1-Dichloroethene	5.6E+01	µg/m ³	2E-01	µg/m ³	NA	—	—	2E+00	µg/m ³	2.0E+02	µg/m ³	1E-02
				cis-1,2-Dichloroethene	1.4E+05	µg/m ³	5E+02	µg/m ³	NA	—	—	6E+03	µg/m ³	NA	—	—
				trans-1,2-Dichloroethene	6.0E+02	µg/m ³	2E+00	µg/m ³	NA	—	—	2E+01	µg/m ³	6.0E+01	µg/m ³	4E-01
				Methyl tert-butyl ether	1.2E+02	µg/m ³	4E-01	µg/m ³	2.6E-07	(µg/m ³) ⁻¹	1E-07	5E+00	µg/m ³	3.0E+03	µg/m ³	2E-03
				Methylene chloride	4.9E+00	µg/m ³	2E-02	µg/m ³	4.7E-07	(µg/m ³) ⁻¹	8E-09	2E-01	µg/m ³	1.0E+03	µg/m ³	2E-04
				Tetrachloroethene	3.5E+02	µg/m ³	1E+00	µg/m ³	5.9E-06	(µg/m ³) ⁻¹	7E-06	1E+01	µg/m ³	2.7E+02	µg/m ³	5E-02
				1,2,3-Trichlorobenzene	8.3E+01	µg/m ³	3E-01	µg/m ³	NA	—	—	3E+00	µg/m ³	NA	—	—
				1,2,4-Trichlorobenzene	5.7E+02	µg/m ³	2E+00	µg/m ³	NA	—	—	2E+01	µg/m ³	2.0E+00	µg/m ³	1E+01
				1,1,2-Trichloroethane	3.8E+01	µg/m ³	1E-01	µg/m ³	1.6E-05	(µg/m ³) ⁻¹	2E-06	2E+00	µg/m ³	NA	—	—
				Trichloroethene	6.9E+04	µg/m ³	2E+02	µg/m ³	2.0E-06	(µg/m ³) ⁻¹	5E-04	3E+03	µg/m ³	NA	—	—
				Vinyl chloride	5.2E+02	µg/m ³	2E+00	µg/m ³	8.8E-06	(µg/m ³) ⁻¹	2E-05	2E+01	µg/m ³	1.0E+02	µg/m ³	2E-01
				Naphthalene	3.3E+00	µg/m ³	1E-02	µg/m ³	3.4E-05	(µg/m ³) ⁻¹	4E-07	1E-01	µg/m ³	3.0E+00	µg/m ³	4E-02
			Exposure Route Total								5E-04					1E+01
		Exposure Point Total									7E-03					8E+02
	Total of Receptor Risks Across Medium										7E-03					8E+02

Notes

^ To calculate cancer risks for these carcinogenic COPCs with a mutagenic mode of action, age-dependent adjustment factors (ADAF) were applied to the cancer slope factors. For the resident child, an ADAF of 10 was used to evaluate exposure between the ages of 0-2; an ADAF of 3 was used to evaluate exposure between the ages of 2-6. To facilitate application of the ADAFs, intakes and dermally absorbed doses were calculated for each of the corresponding age groups, and the appropriate ADAF was applied to the cancer slope factor.

N/A - Not Applicable

NA - Not Available

TABLE 7.1.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Process Water	Dermal Absorption	Benzene	7.2E-04	mg/L	1.0E-07	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	6E-09	1.1E-06	mg/kg-day	4.0E-03	mg/kg-day	3E-04
				Bromodichloromethane	4.1E-04	mg/L	2.2E-08	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	1E-09	2.3E-07	mg/kg-day	2.0E-02	mg/kg-day	1E-05
				Chlorobenzene	3.7E-03	mg/L	1.0E-06	mg/kg-day	NA	--	--	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	5E-04
				Chloroform	2.8E-03	mg/L	2.0E-07	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	6E-09	2.1E-06	mg/kg-day	1.0E-02	mg/kg-day	2E-04
				Dibromochloromethane	3.4E-04	mg/L	1.5E-08	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	1E-09	1.6E-07	mg/kg-day	2.0E-02	mg/kg-day	8E-06
				1,2-Dichlorobenzene	2.1E-03	mg/L	9.1E-07	mg/kg-day	NA	--	--	9.7E-06	mg/kg-day	9.0E-02	mg/kg-day	1E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	3.0E-06	mg/kg-day	NA	--	--	3.2E-05	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	2.1E-06	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	1E-08	2.3E-05	mg/kg-day	7.0E-02	mg/kg-day	3E-04
				1,1-Dichloroethane	7.0E-04	mg/L	4.8E-08	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	3E-10	5.1E-07	mg/kg-day	2.0E-01	mg/kg-day	3E-06
				1,2-Dichloroethane	5.6E-04	mg/L	2.4E-08	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	2E-09	2.5E-07	mg/kg-day	NA	--	--
				1,1-Dichloroethene	5.7E-03	mg/L	6.6E-07	mg/kg-day	NA	--	--	7.0E-06	mg/kg-day	5.0E-02	mg/kg-day	1E-04
				cis-1,2-Dichloroethene	1.4E+01	mg/L	1.1E-03	mg/kg-day	NA	--	--	1.2E-02	mg/kg-day	2.0E-03	mg/kg-day	6E+00
				trans-1,2-Dichloroethene	6.1E-02	mg/L	4.7E-06	mg/kg-day	NA	--	--	5.0E-05	mg/kg-day	2.0E-02	mg/kg-day	3E-03
				Methyl tert-butyl ether	1.3E-02	mg/L	2.7E-07	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	5E-10	2.8E-06	mg/kg-day	NA	--	--
				Methylene chloride	5.0E-04	mg/L	1.8E-08	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	1E-10	1.9E-07	mg/kg-day	6.0E-02	mg/kg-day	3E-06
				Tetrachloroethene	3.6E-02	mg/L	1.3E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	7E-06	1.4E-04	mg/kg-day	1.0E-02	mg/kg-day	1E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	7.0E-06	mg/kg-day	NA	--	--	7.4E-05	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	4.4E-05	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	1E-06	4.6E-04	mg/kg-day	1.0E-02	mg/kg-day	5E-02
				1,1,2-Trichloroethane	3.9E-03	mg/L	2.7E-07	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	2E-08	2.8E-06	mg/kg-day	4.0E-03	mg/kg-day	7E-04
				Trichloroethene	7.0E+00	mg/L	8.7E-04	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	5E-06	9.2E-03	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	2.9E-06	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	2E-06	3.1E-05	mg/kg-day	3.0E-03	mg/kg-day	1E-02
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	9.6E-06	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	1E-07	1.0E-04	mg/kg-day	2.0E-02	mg/kg-day	5E-03
				Dibenzo(a,h)anthracene	1.7E-04	mg/L	6.0E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	4E-05	6.4E-05	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene	1.4E-04	mg/L	3.6E-06	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	3E-06	3.8E-05	mg/kg-day	NA	--	--
				Naphthalene	3.4E-04	mg/L	1.5E-07	mg/kg-day	NA	--	--	1.6E-06	mg/kg-day	2.0E-02	mg/kg-day	8E-05
				Total PCB Aroclors	4.4E-03	mg/L	9.3E-05	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	4E-05	9.8E-04	mg/kg-day	2.0E-05	mg/kg-day	5E+01
				gamma-Chlordane	1.1E-02	mg/L	2.7E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	9E-06	2.8E-04	mg/kg-day	5.0E-04	mg/kg-day	6E-01
				4,4'-DDD	1.6E-01	mg/L	1.2E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	3E-04	1.3E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	3.0E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	1E-04	3.2E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	1.5E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	5E-04	1.6E-02	mg/kg-day	5.0E-04	mg/kg-day	3E+01
				Heptachlor	9.7E-03	mg/L	5.0E-06	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	2E-05	5.3E-05	mg/kg-day	5.0E-04	mg/kg-day	1E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	5.6E-10	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	9E-05	6.0E-09	mg/kg-day	1.0E-09	mg/kg-day	6E+00
				Aluminum	2.7E-01	mg/L	4.9E-06	mg/kg-day	NA	--	--	5.2E-05	mg/kg-day	1.0E+00	mg/kg-day	5E-05
				Arsenic	7.6E-02	mg/L	1.4E-06	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-06	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	5E-02
				Barium	5.4E-01	mg/L	9.9E-06	mg/kg-day	NA	--	--	1.1E-04	mg/kg-day	1.4E-02	mg/kg-day	8E-03
				Cadmium	5.6E-04	mg/L	1.0E-08	mg/kg-day	NA	--	--	1.1E-07	mg/kg-day	2.5E-05	mg/kg-day	4E-03
				Chromium	2.3E-03	mg/L	8.3E-08	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	2E-06	8.8E-07	mg/kg-day	7.5E-05	mg/kg-day	1E-02
				Cobalt	4.2E-04	mg/L	3.1E-09	mg/kg-day	NA	--	--	3.2E-08	mg/kg-day	3.0E-04	mg/kg-day	1E-04
				Iron	5.4E-01	mg/L	9.8E-06	mg/kg-day	NA	--	--	1.0E-04	mg/kg-day	7.0E-01	mg/kg-day	1E-04
				Manganese	3.2E-01	mg/L	5.8E-06	mg/kg-day	NA	--	--	6.2E-05	mg/kg-day	9.6E-04	mg/kg-day	6E-02
				Vanadium	7.4E-03	mg/L	1.4E-07	mg/kg-day	NA	--	--	1.4E-06	mg/kg-day	1.3E-04	mg/kg-day	1E-02
Exposure Route Total										1E-03				9E+01		

TABLE 7.1.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient			
							Value	Units	Value	Units		Value	Units	Value	Units				
Groundwater	Entire Aquifer	Workplace Air	Inhalation	Benzene	1.2E+00	µg/m³	1.9E-02	µg/m³	7.8E-06	(µg/m³)⁻¹	1E-07	2.0E-01	µg/m³	3.0E+01	µg/m³	7E-03			
				Bromodichloromethane	6.6E-01	µg/m³	1.1E-02	µg/m³	3.7E-05	(µg/m³)⁻¹	4E-07	1.1E-01	µg/m³	NA	--	--			
				Chlorobenzene	6.0E+00	µg/m³	9.7E-02	µg/m³	NA	--	--	1.0E+00	µg/m³	5.0E+01	µg/m³	2E-02			
				Chloroform	4.5E+00	µg/m³	7.3E-02	µg/m³	2.3E-05	(µg/m³)⁻¹	2E-06	7.7E-01	µg/m³	9.8E+01	µg/m³	8E-03			
				Dibromochloromethane	5.6E-01	µg/m³	9.0E-03	µg/m³	2.7E-05	(µg/m³)⁻¹	2E-07	9.5E-02	µg/m³	NA	--	--			
				1,2-Dichlorobenzene	3.5E+00	µg/m³	5.6E-02	µg/m³	NA	--	--	6.0E-01	µg/m³	2.0E+02	µg/m³	3E-03			
				1,3-Dichlorobenzene	8.5E+00	µg/m³	1.4E-01	µg/m³	NA	--	--	1.5E+00	µg/m³	NA	--	--			
				1,4-Dichlorobenzene	8.1E+00	µg/m³	1.3E-01	µg/m³	1.1E-05	(µg/m³)⁻¹	1E-06	1.4E+00	µg/m³	8.0E+02	µg/m³	2E-03			
				1,1-Dichloroethane	1.1E+00	µg/m³	1.8E-02	µg/m³	1.6E-06	(µg/m³)⁻¹	3E-08	1.9E-01	µg/m³	NA	--	--			
				1,2-Dichloroethane	9.0E-01	µg/m³	1.5E-02	µg/m³	2.6E-05	(µg/m³)⁻¹	4E-07	1.5E-01	µg/m³	7.0E+00	µg/m³	2E-02			
				1,1-Dichloroethene	9.3E+00	µg/m³	1.5E-01	µg/m³	NA	--	--	1.6E+00	µg/m³	2.0E+02	µg/m³	8E-03			
				cis-1,2-Dichloroethene	2.3E+04	µg/m³	3.7E+02	µg/m³	NA	--	--	3.9E+03	µg/m³	NA	--	--			
				trans-1,2-Dichloroethene	9.9E+01	µg/m³	1.6E+00	µg/m³	NA	--	--	1.7E+01	µg/m³	6.0E+01	µg/m³	3E-01			
				Methyl tert-butyl ether	2.0E+01	µg/m³	3.3E-01	µg/m³	2.6E-07	(µg/m³)⁻¹	9E-08	3.5E+00	µg/m³	3.0E+03	µg/m³	1E-03			
				Methylene chloride	8.2E-01	µg/m³	1.3E-02	µg/m³	4.7E-07	(µg/m³)⁻¹	6E-09	1.4E-01	µg/m³	1.0E+03	µg/m³	1E-04			
				Tetrachloroethene	5.8E+01	µg/m³	9.4E-01	µg/m³	5.9E-06	(µg/m³)⁻¹	6E-06	1.0E+01	µg/m³	2.7E+02	µg/m³	4E-02			
				1,2,3-Trichlorobenzene	1.4E+01	µg/m³	2.2E-01	µg/m³	NA	--	--	2.4E+00	µg/m³	NA	--	--			
				1,2,4-Trichlorobenzene	9.5E+01	µg/m³	1.5E+00	µg/m³	NA	--	--	1.6E+01	µg/m³	2.0E+00	µg/m³	8E+00			
				1,1,2-Trichloroethane	6.3E+00	µg/m³	1.0E-01	µg/m³	1.6E-05	(µg/m³)⁻¹	2E-06	1.1E+00	µg/m³	NA	--	--			
				Trichloroethene	1.1E+04	µg/m³	1.8E+02	µg/m³	2.0E-06	(µg/m³)⁻¹	4E-04	2.0E+03	µg/m³	NA	--	--			
				Vinyl chloride	8.6E+01	µg/m³	1.4E+00	µg/m³	4.4E-06	(µg/m³)⁻¹	6E-06	1.5E+01	µg/m³	1.0E+02	µg/m³	1E-01			
				Naphthalene	5.5E-01	µg/m³	8.9E-03	µg/m³	3.4E-05	(µg/m³)⁻¹	3E-07	9.5E-02	µg/m³	3.0E+00	µg/m³	3E-02			
								Exposure Route Total							4E-04				9E+00
								Exposure Point Total							2E-03				1E+02
								Total of Receptor Risks Across Medium							2E-03				1E+02

Notes
NA - Not Available

TABLE 7.2.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units			
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	Dermal Absorption	Benzene	3.0E-03	mg/L	1.0E-08	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	6E-10	1.0E-05	mg/kg-day	1.2E-02	mg/kg-day	9E-04
				Chlorobenzene	1.7E-02	mg/L	1.1E-07	mg/kg-day	NA	—	—	1.1E-04	mg/kg-day	7.0E-02	mg/kg-day	2E-03
				Chloroform	2.8E-03	mg/L	4.9E-09	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	2E-10	4.8E-06	mg/kg-day	1.0E-01	mg/kg-day	5E-05
				1,2-Dibromo-3-chloropropane	7.7E-05	mg/L	2.1E-10	mg/kg-day	8.0E-01	(mg/kg-day) ⁻¹	2E-10	2.0E-07	mg/kg-day	2.0E-03	mg/kg-day	1E-04
				Dibromochloromethane	5.5E-04	mg/L	5.9E-10	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	5E-11	5.8E-07	mg/kg-day	7.0E-02	mg/kg-day	8E-06
				1,2-Dichlorobenzene	7.2E-03	mg/L	7.4E-08	mg/kg-day	NA	—	—	7.3E-05	mg/kg-day	6.0E-01	mg/kg-day	1E-04
				1,3-Dichlorobenzene	1.4E-02	mg/L	2.0E-07	mg/kg-day	NA	—	—	1.9E-04	mg/kg-day	2.0E-02	mg/kg-day	1E-02
				1,4-Dichlorobenzene	1.9E-02	mg/L	2.0E-07	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	1E-09	1.9E-04	mg/kg-day	7.0E-02	mg/kg-day	3E-03
				1,1-Dichloroethane	2.9E-03	mg/L	4.9E-09	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	3E-11	4.8E-06	mg/kg-day	2.0E+00	mg/kg-day	2E-06
				1,2-Dichloroethane	4.6E-03	mg/L	4.7E-09	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	4E-10	4.6E-06	mg/kg-day	2.0E-02	mg/kg-day	2E-04
				1,1-Dichloroethene	6.8E-02	mg/L	1.9E-07	mg/kg-day	NA	—	—	1.9E-04	mg/kg-day	5.0E-02	mg/kg-day	4E-03
				cis-1,2-Dichloroethene	1.4E+02	mg/L	2.6E-04	mg/kg-day	NA	—	—	2.6E-01	mg/kg-day	2.0E-02	mg/kg-day	1E+01
				trans-1,2-Dichloroethene	5.8E-01	mg/L	1.1E-06	mg/kg-day	NA	—	—	1.1E-03	mg/kg-day	2.0E-01	mg/kg-day	5E-03
				Ethylbenzene	1.1E-02	mg/L	1.2E-07	mg/kg-day	1.1E-02	(mg/kg-day) ⁻¹	1E-09	1.2E-04	mg/kg-day	1.0E-01	mg/kg-day	1E-03
				Methylcyclohexane	5.9E-03	mg/L	1.3E-07	mg/kg-day	NA	—	—	1.2E-04	mg/kg-day	NA	—	—
				Methylene chloride	7.0E-03	mg/L	5.9E-09	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	4E-11	5.8E-06	mg/kg-day	6.0E-02	mg/kg-day	1E-04
				Tetrachloroethene	5.4E-01	mg/L	4.7E-06	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	3E-06	4.7E-03	mg/kg-day	1.0E-01	mg/kg-day	5E-02
				1,2,3-Trichlorobenzene	7.4E-02	mg/L	1.5E-06	mg/kg-day	NA	—	—	1.4E-03	mg/kg-day	8.0E-03	mg/kg-day	2E-01
				1,2,4-Trichlorobenzene	1.8E-01	mg/L	3.2E-06	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	9E-08	3.2E-03	mg/kg-day	1.0E-01	mg/kg-day	3E-02
				1,1,2-Trichloroethane	1.4E-02	mg/L	2.3E-08	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	1E-09	2.2E-05	mg/kg-day	4.0E-03	mg/kg-day	6E-03
				Trichloroethene	2.3E+01	mg/L	6.9E-05	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	4E-07	6.8E-02	mg/kg-day	NA	—	—
				o-Xylene	3.8E-02	mg/L	4.0E-07	mg/kg-day	NA	—	—	4.0E-04	mg/kg-day	4.0E-01	mg/kg-day	1E-03
				Vinyl chloride	1.6E-01	mg/L	2.1E-07	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	2E-07	2.1E-04	mg/kg-day	3.0E-03	mg/kg-day	7E-02
				Benzo(a)anthracene	6.1E-04	mg/L	1.0E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	8E-08	1.0E-04	mg/kg-day	NA	—	—
				Benzo(a)pyrene	3.5E-04	mg/L	1.0E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	7E-07	1.0E-04	mg/kg-day	NA	—	—
				Benzo(b)fluoranthene	2.1E-03	mg/L	6.1E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	4E-07	6.0E-04	mg/kg-day	NA	—	—
				Benzo(g,h,i)perylene	3.7E-04	mg/L	2.1E-07	mg/kg-day	NA	—	—	2.0E-04	mg/kg-day	NA	—	—
				Benzo(k)fluoranthene	7.2E-04	mg/L	2.1E-07	mg/kg-day	7.3E-02	(mg/kg-day) ⁻¹	2E-08	2.0E-04	mg/kg-day	NA	—	—
				1,1-Biphenyl	2.7E-03	mg/L	6.0E-08	mg/kg-day	NA	—	—	5.9E-05	mg/kg-day	1.0E-01	mg/kg-day	6E-04
				Dibenzo(a,h)anthracene	1.4E-03	mg/L	6.0E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	4E-06	5.9E-04	mg/kg-day	NA	—	—
				Indeno(1,2,3-cd)pyrene	3.8E-04	mg/L	1.2E-07	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	8E-08	1.1E-04	mg/kg-day	NA	—	—
				Naphthalene	2.0E-03	mg/L	2.1E-08	mg/kg-day	NA	—	—	2.1E-05	mg/kg-day	2.0E-01	mg/kg-day	1E-04
				Phenanthrene	5.2E-04	mg/L	1.9E-08	mg/kg-day	NA	—	—	1.9E-05	mg/kg-day	NA	—	—
				Total PCB Aroclors	1.2E-02	mg/L	3.0E-06	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	1E-06	2.9E-03	mg/kg-day	6.0E-05	mg/kg-day	5E+01
				alpha-BHC	4.9E-04	mg/L	2.9E-09	mg/kg-day	6.3E+00	(mg/kg-day) ⁻¹	2E-08	2.8E-06	mg/kg-day	8.0E-03	mg/kg-day	4E-04
				delta-BHC	1.4E-03	mg/L	1.4E-08	mg/kg-day	NA	—	—	1.3E-05	mg/kg-day	NA	—	—
				gamma-BHC	2.0E-04	mg/L	1.0E-09	mg/kg-day	1.1E+00	(mg/kg-day) ⁻¹	1E-09	1.0E-06	mg/kg-day	3.0E-03	mg/kg-day	3E-04
				gamma-Chlordane	2.2E-03	mg/L	6.5E-08	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	2E-08	6.4E-05	mg/kg-day	5.0E-04	mg/kg-day	1E-01
				4,4'-DDD	5.9E-04	mg/L	5.4E-08	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	1E-08	5.3E-05	mg/kg-day	NA	—	—
				4,4'-DDE	1.3E-03	mg/L	1.0E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	4E-08	1.0E-04	mg/kg-day	NA	—	—
				4,4'-DDT	4.4E-03	mg/L	6.7E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-07	6.5E-04	mg/kg-day	5.0E-04	mg/kg-day	1E+00
				Dieldrin	4.7E-04	mg/L	4.3E-09	mg/kg-day	1.6E+01	(mg/kg-day) ⁻¹	7E-08	4.3E-06	mg/kg-day	1.0E-04	mg/kg-day	4E-02
				Endosulfan II	1.1E-03	mg/L	3.7E-09	mg/kg-day	NA	—	—	3.6E-06	mg/kg-day	6.0E-03	mg/kg-day	6E-04
				Endosulfan sulfate	4.5E-04	mg/L	1.0E-09	mg/kg-day	NA	—	—	9.9E-07	mg/kg-day	NA	—	—
				Endrin aldehyde	7.7E-04	mg/L	1.3E-08	mg/kg-day	NA	—	—	1.3E-05	mg/kg-day	NA	—	—
				Heptachlor	8.7E-04	mg/L	5.4E-09	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	2E-08	5.3E-06	mg/kg-day	5.0E-04	mg/kg-day	1E-02
				2,3,7,8-TCDD Toxic Equivalence	5.4E-08	mg/L	1.4E-11	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	2E-06	1.4E-08	mg/kg-day	2.0E-08	mg/kg-day	7E-01
				Aluminum	1.8E+00	mg/L	4.1E-07	mg/kg-day	NA	—	—	4.0E-04	mg/kg-day	1.0E+00	mg/kg-day	4E-04
				Arsenic	1.4E-01	mg/L	3.1E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	5E-08	3.0E-05	mg/kg-day	3.0E-04	mg/kg-day	1E-01
				Barium	8.2E-01	mg/L	1.8E-07	mg/kg-day	NA	—	—	1.8E-04	mg/kg-day	1.4E-02	mg/kg-day	1E-02
				Cadmium	3.3E-03	mg/L	7.4E-10	mg/kg-day	NA	—	—	7.2E-07	mg/kg-day	2.5E-05	mg/kg-day	3E-02
				Chromium	2.9E-02	mg/L	1.3E-08	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	3E-07	1.3E-05	mg/kg-day	5.0E-04	mg/kg-day	3E-02
				Cobalt	9.3E-04	mg/L	8.2E-11	mg/kg-day	NA	—	—	8.1E-08	mg/kg-day	3.0E-03	mg/kg-day	3E-05
				Iron	2.7E+00	mg/L	6.0E-07	mg/kg-day	NA	—	—	5.9E-04	mg/kg-day	7.0E-01	mg/kg-day	8E-04
				Manganese	6.7E-01	mg/L	1.5E-07	mg/kg-day	NA	—	—	1.4E-04	mg/kg-day	9.6E-04	mg/kg-day	2E-01
				Vanadium	7.8E-03	mg/L	1.7E-09	mg/kg-day	NA	—	—	1.7E-06	mg/kg-day	1.3E-04	mg/kg-day	1E-02
Exposure Route Total										1E-05					6E+01	

TABLE 7.2.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Subchronic																			
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations							
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient			
							Value	Units	Value	Units		Value	Units						
Groundwater	Shallow Onsite Groundwater	Outdoor Air Around an Excavation	Inhalation	Benzene	4.7E-03	µg/m³	9.2E-07	µg/m³	7.8E-06	(µg/m³)⁻¹	7E-12	9.1E-04	µg/m³	9.0E+01	µg/m³	1E-05			
				Chlorobenzene	1.9E-02	µg/m³	3.7E-06	µg/m³	NA	—	—	3.6E-03	µg/m³	5.0E+02	µg/m³	7E-06			
				Chloroform	3.6E-03	µg/m³	7.0E-07	µg/m³	2.3E-05	(µg/m³)⁻¹	2E-11	6.9E-04	µg/m³	2.4E+02	µg/m³	3E-06			
				1,2-Dibromo-3-chloropropane	5.3E-05	µg/m³	1.0E-08	µg/m³	6.0E-03	(µg/m³)⁻¹	6E-11	1.0E-05	µg/m³	2.0E+00	µg/m³	5E-06			
				Dibromochloromethane	5.0E-04	µg/m³	9.8E-08	µg/m³	2.7E-05	(µg/m³)⁻¹	3E-12	9.6E-05	µg/m³	NA	—	—			
				1,2-Dichlorobenzene	8.1E-03	µg/m³	1.6E-06	µg/m³	NA	—	—	1.6E-03	µg/m³	2.0E+03	µg/m³	8E-07			
				1,3-Dichlorobenzene	1.6E-02	µg/m³	3.1E-06	µg/m³	NA	—	—	3.1E-03	µg/m³	NA	—	—			
				1,4-Dichlorobenzene	2.2E-02	µg/m³	4.2E-06	µg/m³	1.1E-05	(µg/m³)⁻¹	5E-11	4.1E-03	µg/m³	2.4E+03	µg/m³	2E-06			
				1,1-Dichloroethane	4.1E-03	µg/m³	8.0E-07	µg/m³	1.6E-06	(µg/m³)⁻¹	1E-12	7.8E-04	µg/m³	NA	—	—			
				1,2-Dichloroethane	6.1E-03	µg/m³	1.2E-06	µg/m³	2.6E-05	(µg/m³)⁻¹	3E-11	1.2E-03	µg/m³	7.0E+01	µg/m³	2E-05			
				1,1-Dichloroethene	9.7E-02	µg/m³	1.9E-05	µg/m³	NA	—	—	1.9E-02	µg/m³	2.0E+02	µg/m³	9E-05			
				cis-1,2-Dichloroethene	2.0E+02	µg/m³	3.8E-02	µg/m³	NA	—	—	3.8E+01	µg/m³	NA	—	—			
				trans-1,2-Dichloroethene	8.2E-01	µg/m³	1.6E-04	µg/m³	NA	—	—	1.6E-01	µg/m³	7.9E+02	µg/m³	2E-04			
				Ethylbenzene	1.5E-02	µg/m³	2.9E-06	µg/m³	2.5E-06	(µg/m³)⁻¹	7E-12	2.8E-03	µg/m³	9.0E+03	µg/m³	3E-07			
				Methylcyclohexane	8.3E-03	µg/m³	1.6E-06	µg/m³	NA	—	—	1.6E-03	µg/m³	3.0E+03	µg/m³	5E-07			
				Methylene chloride	1.0E-02	µg/m³	2.0E-06	µg/m³	4.7E-07	(µg/m³)⁻¹	1E-12	2.0E-03	µg/m³	1.0E+03	µg/m³	2E-06			
				Tetrachloroethene	5.8E-01	µg/m³	1.1E-04	µg/m³	5.9E-06	(µg/m³)⁻¹	7E-10	1.1E-01	µg/m³	2.7E+02	µg/m³	4E-04			
				1,2,3-Trichlorobenzene	7.4E-02	µg/m³	1.5E-05	µg/m³	NA	—	—	1.4E-02	µg/m³	NA	—	—			
				1,2,4-Trichlorobenzene	1.8E-01	µg/m³	3.5E-05	µg/m³	NA	—	—	3.5E-02	µg/m³	2.0E+01	µg/m³	2E-03			
				1,1,2-Trichloroethane	1.6E-02	µg/m³	3.1E-06	µg/m³	1.6E-05	(µg/m³)⁻¹	5E-11	3.0E-03	µg/m³	NA	—	—			
				Trichloroethene	2.8E+01	µg/m³	5.5E-03	µg/m³	2.0E-06	(µg/m³)⁻¹	1E-08	5.4E+00	µg/m³	NA	—	—			
				o-Xylene	5.1E-02	µg/m³	1.0E-05	µg/m³	NA	—	—	9.8E-03	µg/m³	4.0E+02	µg/m³	2E-05			
				Vinyl chloride	2.8E-01	µg/m³	5.5E-05	µg/m³	4.4E-06	(µg/m³)⁻¹	2E-10	5.4E-02	µg/m³	1.0E+02	µg/m³	5E-04			
				Naphthalene	2.2E-03	µg/m³	4.4E-07	µg/m³	3.4E-05	(µg/m³)⁻¹	1E-11	4.3E-04	µg/m³	3.0E+00	µg/m³	1E-04			
				Phenanthrene	2.5E-04	µg/m³	4.8E-08	µg/m³	NA	—	—	4.8E-05	µg/m³	NA	—	—			
							Exposure Route Total								1E-08				3E-03
							Exposure Point Total								1E-05				6E+01
				Total of Receptor Risks Across Medium								1E-05				6E+01			

Notes
NA - Not Available

TABLE 7.3.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, SBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Subchronic																		
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Dermal Absorption	Benzene	5.0E-04	mg/L	1.7E-09	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	1E-10	1.7E-06	mg/kg-day	1.2E-02	mg/kg-day	1E-04		
				Chloroform	1.1E-03	mg/L	1.9E-09	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	6E-11	1.9E-06	mg/kg-day	1.0E-01	mg/kg-day	2E-05		
				Dibromochloromethane	5.1E-04	mg/L	5.5E-10	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	5E-11	5.4E-07	mg/kg-day	7.0E-02	mg/kg-day	8E-06		
				cis-1,2-Dichloroethene	1.7E-02	mg/L	3.2E-08	mg/kg-day	NA	--	--	3.1E-05	mg/kg-day	2.0E-02	mg/kg-day	2E-03		
				Methyl tert-butyl ether	1.9E-01	mg/L	9.8E-08	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	2E-10	9.7E-05	mg/kg-day	3.0E-01	mg/kg-day	3E-04		
				Tetrachloroethene	1.9E-03	mg/L	1.7E-08	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	9E-09	1.7E-05	mg/kg-day	1.0E-01	mg/kg-day	2E-04		
				Trichloroethene	1.1E+00	mg/L	3.4E-06	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	2E-08	3.3E-03	mg/kg-day	NA	--	--		
				Dibenzo(a,h)anthracene	2.4E-03	mg/L	1.1E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	8E-06	1.0E-03	mg/kg-day	NA	--	--		
				Indeno(1,2,3-cd)pyrene	1.1E-04	mg/L	3.3E-08	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	2E-08	3.3E-05	mg/kg-day	NA	--	--		
				Naphthalene	1.3E-04	mg/L	1.3E-09	mg/kg-day	NA	--	--	1.3E-06	mg/kg-day	2.0E-01	mg/kg-day	7E-06		
				Total PCB Aroclors	5.1E-03	mg/L	1.3E-06	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	5E-07	1.3E-03	mg/kg-day	6.0E-05	mg/kg-day	2E+01		
				2,3,7,8-TCDD Toxic Equivalence	1.7E-09	mg/L	4.5E-13	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	7E-08	4.4E-10	mg/kg-day	2.0E-08	mg/kg-day	2E-02		
				Arsenic	3.7E-02	mg/L	8.2E-09	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-08	8.0E-06	mg/kg-day	3.0E-04	mg/kg-day	3E-02		
				Barium	8.3E+00	mg/L	1.8E-06	mg/kg-day	NA	--	--	1.8E-03	mg/kg-day	1.4E-02	mg/kg-day	1E-01		
				Chromium	5.7E-04	mg/L	2.5E-10	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	5E-09	2.5E-07	mg/kg-day	5.0E-04	mg/kg-day	5E-04		
				Manganese	3.2E-01	mg/L	7.2E-08	mg/kg-day	NA	--	--	7.1E-05	mg/kg-day	9.6E-04	mg/kg-day	7E-02		
				Exposure Route Total										8E-06				
				Outdoor Air Around an Excavation	Inhalation	Benzene	7.9E-04	µg/m ³	1.5E-07	µg/m ³	7.8E-06	(µg/m ³) ⁻¹	1E-12	1.5E-04	µg/m ³	9.0E+01	µg/m ³	2E-06
						Chloroform	1.4E-03	µg/m ³	2.7E-07	µg/m ³	2.3E-05	(µg/m ³) ⁻¹	6E-12	2.7E-04	µg/m ³	2.4E+02	µg/m ³	1E-06
						Dibromochloromethane	4.7E-04	µg/m ³	9.1E-08	µg/m ³	2.7E-05	(µg/m ³) ⁻¹	2E-12	9.0E-05	µg/m ³	NA	--	--
						cis-1,2-Dichloroethene	2.4E-02	µg/m ³	4.7E-06	µg/m ³	NA	--	--	4.6E-03	µg/m ³	NA	--	--
						Methyl tert-butyl ether	2.7E-01	µg/m ³	5.4E-05	µg/m ³	2.6E-07	(µg/m ³) ⁻¹	1E-11	5.3E-02	µg/m ³	3.0E+03	µg/m ³	2E-05
						Tetrachloroethene	2.1E-03	µg/m ³	4.0E-07	µg/m ³	5.9E-06	(µg/m ³) ⁻¹	2E-12	4.0E-04	µg/m ³	2.7E+02	µg/m ³	1E-06
						Trichloroethene	1.4E+00	µg/m ³	2.7E-04	µg/m ³	2.0E-06	(µg/m ³) ⁻¹	5E-10	2.7E-01	µg/m ³	NA	--	--
						Naphthalene	1.4E-04	µg/m ³	2.7E-08	µg/m ³	3.4E-05	(µg/m ³) ⁻¹	9E-13	2.7E-05	µg/m ³	3.0E+00	µg/m ³	9E-06
		Exposure Route Total										6E-10					3E-05	
		Exposure Point Total										8E-06					2E+01	
		Total of Receptor Risks Across Medium										8E-06					2E+01	

Notes
NA - Not Available

TABLE 7.4.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Subchronic																	
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Dermal Absorption	Benzene	1.2E-03	mg/L	4.2E-09	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	2E-10	4.2E-06	mg/kg-day	1.2E-02	mg/kg-day	3E-04	
				Bromodichloromethane	3.5E-04	mg/L	4.5E-10	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	3E-11	4.5E-07	mg/kg-day	2.0E-02	mg/kg-day	2E-05	
				Chloroform	1.4E-03	mg/L	2.5E-09	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	8E-11	2.5E-06	mg/kg-day	1.0E-01	mg/kg-day	2E-05	
				cis-1,2-Dichloroethene	4.9E-02	mg/L	9.1E-08	mg/kg-day	NA	--	--	9.0E-05	mg/kg-day	2.0E-02	mg/kg-day	4E-03	
				Tetrachloroethene	3.8E-04	mg/L	3.3E-09	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	2E-09	3.3E-06	mg/kg-day	1.0E-01	mg/kg-day	3E-05	
				Trichloroethene	2.4E-01	mg/L	7.1E-07	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	4E-09	7.0E-04	mg/kg-day	NA	--	--	
				Vinyl chloride	3.6E-04	mg/L	4.8E-10	mg/kg-day	7.2E-01	(mg/kg-day) ⁻¹	3E-10	4.7E-07	mg/kg-day	3.0E-03	mg/kg-day	2E-04	
				Benzo(g,h,i)perylene	9.8E-05	mg/L	5.4E-08	mg/kg-day	NA	--	--	5.3E-05	mg/kg-day	NA	--	--	
				bis(2-Ethylhexyl)phthalate	5.2E-03	mg/L	1.1E-07	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	1E-09	1.0E-04	mg/kg-day	2.0E-01	mg/kg-day	5E-04	
				Indeno(1,2,3-cd)pyrene	1.2E-04	mg/L	3.7E-08	mg/kg-day	7.3E-01	(mg/kg-day) ⁻¹	3E-08	3.6E-05	mg/kg-day	NA	--	--	
				Naphthalene	1.1E-04	mg/L	1.2E-09	mg/kg-day	NA	--	--	1.2E-06	mg/kg-day	2.0E-01	mg/kg-day	6E-06	
				Total PCB Aroclors	4.8E-04	mg/L	1.2E-07	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	5E-08	1.2E-04	mg/kg-day	6.0E-05	mg/kg-day	2E+00	
				beta-BHC	3.5E-04	mg/L	1.9E-09	mg/kg-day	1.8E+00	(mg/kg-day) ⁻¹	3E-09	1.9E-06	mg/kg-day	6.0E-04	mg/kg-day	3E-03	
				delta-BHC	4.2E-04	mg/L	4.2E-09	mg/kg-day	NA	--	--	4.1E-06	mg/kg-day	NA	--	--	
				4,4'-DDD	7.6E-04	mg/L	7.0E-08	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	2E-08	6.9E-05	mg/kg-day	NA	--	--	
				4,4'-DDE	7.5E-04	mg/L	5.8E-08	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-08	5.7E-05	mg/kg-day	NA	--	--	
				4,4'-DDT	9.6E-04	mg/L	1.5E-07	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	5E-08	1.4E-04	mg/kg-day	5.0E-04	mg/kg-day	3E-01	
				Heptachlor	2.0E-04	mg/L	1.3E-09	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	6E-09	1.2E-06	mg/kg-day	5.0E-04	mg/kg-day	2E-03	
				Antimony	2.2E-03	mg/L	4.9E-10	mg/kg-day	NA	--	--	4.8E-07	mg/kg-day	6.0E-05	mg/kg-day	8E-03	
				Arsenic	1.1E-01	mg/L	2.4E-08	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4E-08	2.3E-05	mg/kg-day	3.0E-04	mg/kg-day	8E-02	
				Chromium	1.2E-03	mg/L	5.2E-10	mg/kg-day	2.0E+01	(mg/kg-day) ⁻¹	1E-08	5.1E-07	mg/kg-day	5.0E-04	mg/kg-day	1E-03	
				Cobalt	4.3E-04	mg/L	3.8E-11	mg/kg-day	NA	--	--	3.8E-08	mg/kg-day	3.0E-03	mg/kg-day	1E-05	
				Manganese	5.9E-01	mg/L	1.3E-07	mg/kg-day	NA	--	--	1.3E-04	mg/kg-day	9.6E-04	mg/kg-day	1E-01	
				Vanadium	8.4E-03	mg/L	1.9E-09	mg/kg-day	NA	--	--	1.8E-06	mg/kg-day	1.3E-04	mg/kg-day	1E-02	
				Exposure Route Total										2E-07			
			Outdoor Air Around an Excavation	Inhalation	Benzene	1.9E-03	µg/m ³	3.8E-07	µg/m ³	7.8E-06	(µg/m ³) ⁻¹	3E-12	3.7E-04	µg/m ³	9.0E+01	µg/m ³	4E-06
					Bromodichloromethane	3.7E-04	µg/m ³	7.3E-08	µg/m ³	3.7E-05	(µg/m ³) ⁻¹	3E-12	7.2E-05	µg/m ³	2.0E+01	µg/m ³	4E-06
					Chloroform	1.8E-03	µg/m ³	3.6E-07	µg/m ³	2.3E-05	(µg/m ³) ⁻¹	8E-12	3.5E-04	µg/m ³	2.4E+02	µg/m ³	1E-06
					cis-1,2-Dichloroethene	6.8E-02	µg/m ³	1.3E-05	µg/m ³	NA	--	--	1.3E-02	µg/m ³	NA	--	--
					Tetrachloroethene	4.1E-04	µg/m ³	8.0E-08	µg/m ³	5.9E-06	(µg/m ³) ⁻¹	5E-13	7.8E-05	µg/m ³	2.7E+02	µg/m ³	3E-07
					Trichloroethene	2.9E-01	µg/m ³	5.7E-05	µg/m ³	2.0E-06	(µg/m ³) ⁻¹	1E-10	5.6E-02	µg/m ³	NA	--	--
					Vinyl chloride	6.4E-04	µg/m ³	1.2E-07	µg/m ³	4.4E-06	(µg/m ³) ⁻¹	5E-13	1.2E-04	µg/m ³	1.0E+02	µg/m ³	1E-06
					Naphthalene	1.3E-04	µg/m ³	2.5E-08	µg/m ³	3.4E-05	(µg/m ³) ⁻¹	8E-13	2.4E-05	µg/m ³	3.0E+00	µg/m ³	8E-06
		Exposure Route Total										1E-10					2E-05
		Exposure Point Total										2E-07					3E+00
	Total of Receptor Risks Across Medium										2E-07					3E+00	

TABLE 7.5.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Tap Water	Ingestion	Benzene	7.2E-04	mg/L	1.3E-06	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	7E-08	9.9E-06	mg/kg-day	4.0E-03	mg/kg-day	2E-03
				Bromodichloromethane	4.1E-04	mg/L	7.2E-07	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	4E-08	5.6E-06	mg/kg-day	2.0E-02	mg/kg-day	3E-04
				Chlorobenzene	3.7E-03	mg/L	6.5E-06	mg/kg-day	NA	--	--	5.1E-05	mg/kg-day	2.0E-02	mg/kg-day	3E-03
				Chloroform	2.8E-03	mg/L	4.9E-06	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	2E-07	3.8E-05	mg/kg-day	1.0E-02	mg/kg-day	4E-03
				Dibromochloromethane	3.4E-04	mg/L	6.0E-07	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	5E-08	4.7E-06	mg/kg-day	2.0E-02	mg/kg-day	2E-04
				1,2-Dichlorobenzene	2.1E-03	mg/L	3.8E-06	mg/kg-day	NA	--	--	2.9E-05	mg/kg-day	9.0E-02	mg/kg-day	3E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	9.2E-06	mg/kg-day	NA	--	--	7.2E-05	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	8.8E-06	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	5E-08	6.9E-05	mg/kg-day	7.0E-02	mg/kg-day	1E-03
				1,1-Dichloroethane	7.0E-04	mg/L	1.2E-06	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	7E-09	9.6E-06	mg/kg-day	2.0E-01	mg/kg-day	5E-05
				1,2-Dichloroethane	5.6E-04	mg/L	9.8E-07	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	9E-08	7.6E-06	mg/kg-day	NA	--	--
				1,1-Dichloroethene	5.7E-03	mg/L	1.0E-05	mg/kg-day	NA	--	--	7.8E-05	mg/kg-day	5.0E-02	mg/kg-day	2E-03
				cis-1,2-Dichloroethene	1.4E+01	mg/L	2.5E-02	mg/kg-day	NA	--	--	1.9E-01	mg/kg-day	2.0E-03	mg/kg-day	1E+02
				trans-1,2-Dichloroethene	6.1E-02	mg/L	1.1E-04	mg/kg-day	NA	--	--	8.3E-04	mg/kg-day	2.0E-02	mg/kg-day	4E-02
				Methyl tert-butyl ether	1.3E-02	mg/L	2.2E-05	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	4E-08	1.7E-04	mg/kg-day	NA	--	--
				Methylene chloride	5.0E-04	mg/L	8.9E-07	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	7E-09	6.9E-06	mg/kg-day	6.0E-02	mg/kg-day	1E-04
				Tetrachloroethene	3.6E-02	mg/L	6.3E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	3E-05	4.9E-04	mg/kg-day	1.0E-02	mg/kg-day	5E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	1.5E-05	mg/kg-day	NA	--	--	1.2E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	1.0E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	3E-06	8.0E-04	mg/kg-day	1.0E-02	mg/kg-day	8E-02
				1,1,2-Trichloroethane	3.9E-03	mg/L	6.9E-06	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	4E-07	5.3E-05	mg/kg-day	4.0E-03	mg/kg-day	1E-02
				Trichloroethene	7.0E+00	mg/L	1.2E-02	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	7E-05	9.6E-02	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	9.4E-05	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-04	7.3E-04	mg/kg-day	3.0E-03	mg/kg-day	2E-01
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	1.0E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	1E-07	7.9E-05	mg/kg-day	2.0E-02	mg/kg-day	4E-03
				Dibenzo(a,h)anthracene	1.7E-04	mg/L	3.1E-08	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	2E-06	2.3E-06	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene	1.4E-04	mg/L	2.7E-08	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	2E-07	2.0E-06	mg/kg-day	NA	--	--
				Naphthalene	3.4E-04	mg/L	6.0E-07	mg/kg-day	NA	--	--	4.7E-06	mg/kg-day	2.0E-02	mg/kg-day	2E-04
				Total PCB Aroclors	4.4E-03	mg/L	7.8E-06	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	3E-06	6.1E-05	mg/kg-day	2.0E-05	mg/kg-day	3E+00
				gamma-Chlordane	1.1E-02	mg/L	1.9E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	7E-06	1.5E-04	mg/kg-day	5.0E-04	mg/kg-day	3E-01
				4,4'-DDD	1.6E-01	mg/L	2.8E-04	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	7E-05	2.2E-03	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	8.4E-05	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	3E-05	6.5E-04	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	2.1E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	7E-05	1.6E-03	mg/kg-day	5.0E-04	mg/kg-day	3E+00
				Heptachlor	9.7E-03	mg/L	1.7E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	8E-05	1.3E-04	mg/kg-day	5.0E-04	mg/kg-day	3E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	4.6E-11	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	7E-06	3.6E-10	mg/kg-day	1.0E-09	mg/kg-day	4E-01
				Aluminum	2.7E-01	mg/L	4.7E-04	mg/kg-day	NA	--	--	3.7E-03	mg/kg-day	1.0E+00	mg/kg-day	4E-03
				Arsenic	7.6E-02	mg/L	1.3E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-04	1.0E-03	mg/kg-day	3.0E-04	mg/kg-day	3E+00
				Barium	5.4E-01	mg/L	9.6E-04	mg/kg-day	NA	--	--	7.5E-03	mg/kg-day	2.0E-01	mg/kg-day	4E-02
				Cadmium	5.6E-04	mg/L	9.9E-07	mg/kg-day	NA	--	--	7.7E-06	mg/kg-day	5.0E-04	mg/kg-day	2E-02
				Chromium	2.3E-03	mg/L	4.3E-07	mg/kg-day	5.0E+00	(mg/kg-day) ⁻¹	2E-06	3.1E-05	mg/kg-day	3.0E-03	mg/kg-day	1E-02
				Cobalt	4.2E-04	mg/L	7.4E-07	mg/kg-day	NA	--	--	5.7E-06	mg/kg-day	3.0E-04	mg/kg-day	2E-02
				Iron	5.4E-01	mg/L	9.5E-04	mg/kg-day	NA	--	--	7.4E-03	mg/kg-day	7.0E-01	mg/kg-day	1E-02
				Manganese	3.2E-01	mg/L	5.6E-04	mg/kg-day	NA	--	--	4.4E-03	mg/kg-day	2.4E-02	mg/kg-day	2E-01
				Vanadium	7.4E-03	mg/L	1.3E-05	mg/kg-day	NA	--	--	1.0E-04	mg/kg-day	5.0E-03	mg/kg-day	2E-02
Exposure Route Total										7E-04					1E+02	

TABLE 7.5.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Shower	Dermal Absorption	Benzene	7.2E-04	mg/L	8.5E-08	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	5E-09	1.5E-06	mg/kg-day	4.0E-03	mg/kg-day	4E-04
				Bromodichloromethane	4.1E-04	mg/L	N/A	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Chlorobenzene	3.7E-03	mg/L	9.9E-07	mg/kg-day	NA	--	--	7.7E-06	mg/kg-day	2.0E-02	mg/kg-day	4E-04
				Chloroform	2.8E-03	mg/L	N/A	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	1.0E-02	mg/kg-day	N/A
				Dibromochloromethane	3.4E-04	mg/L	N/A	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				1,2-Dichlorobenzene	2.1E-03	mg/L	1.1E-06	mg/kg-day	NA	--	--	8.5E-06	mg/kg-day	9.0E-02	mg/kg-day	9E-05
				1,3-Dichlorobenzene	5.2E-03	mg/L	3.7E-06	mg/kg-day	NA	--	--	2.9E-05	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	2.5E-06	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	1E-08	2.0E-05	mg/kg-day	7.0E-02	mg/kg-day	3E-04
				1,1-Dichloroethane	7.0E-04	mg/L	N/A	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-01	mg/kg-day	N/A
				1,2-Dichloroethane	5.6E-04	mg/L	N/A	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				1,1-Dichloroethene	5.7E-03	mg/L	5.9E-07	mg/kg-day	NA	--	--	4.6E-06	mg/kg-day	5.0E-02	mg/kg-day	9E-05
				cis-1,2-Dichloroethene	1.4E+01	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-03	mg/kg-day	N/A
				trans-1,2-Dichloroethene	6.1E-02	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Methyl tert-butyl ether	1.3E-02	mg/L	N/A	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				Methylene chloride	5.0E-04	mg/L	N/A	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	6.0E-02	mg/kg-day	N/A
				Tetrachloroethene	3.6E-02	mg/L	1.7E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	9E-06	1.3E-04	mg/kg-day	1.0E-02	mg/kg-day	1E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	9.6E-06	mg/kg-day	NA	--	--	7.5E-05	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	5.9E-05	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	2E-06	4.6E-04	mg/kg-day	1.0E-02	mg/kg-day	5E-02
				1,1,2-Trichloroethane	3.9E-03	mg/L	N/A	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Trichloroethene	7.0E+00	mg/L	9.0E-04	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	5E-06	7.0E-03	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	N/A	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	3.0E-03	mg/kg-day	N/A
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	1.4E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	2E-07	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	5E-03
				Dibenzo(a,h)anthracene	1.7E-04	mg/L	9.2E-07	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	7E-05	6.5E-05	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene	1.4E-04	mg/L	5.5E-07	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	4E-06	3.9E-05	mg/kg-day	NA	--	--
				Naphthalene	3.4E-04	mg/L	1.7E-07	mg/kg-day	NA	--	--	1.3E-06	mg/kg-day	2.0E-02	mg/kg-day	7E-05
				Total PCB Aroclors	4.4E-03	mg/L	1.3E-04	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	5E-05	1.0E-03	mg/kg-day	2.0E-05	mg/kg-day	5E+01
				gamma-Chlordane	1.1E-02	mg/L	3.7E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	1E-05	2.9E-04	mg/kg-day	5.0E-04	mg/kg-day	6E-01
				4,4'-DDD	1.6E-01	mg/L	1.7E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	4E-04	1.3E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	4.4E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	1E-04	3.4E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	2.1E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	7E-04	1.7E-02	mg/kg-day	5.0E-04	mg/kg-day	3E+01
				Heptachlor	9.7E-03	mg/L	7.0E-06	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	3E-05	5.5E-05	mg/kg-day	5.0E-04	mg/kg-day	1E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	8.0E-10	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	1E-04	6.2E-09	mg/kg-day	1.0E-09	mg/kg-day	6E+00
				Aluminum	2.7E-01	mg/L	9.3E-07	mg/kg-day	NA	--	--	7.3E-06	mg/kg-day	1.0E+00	mg/kg-day	7E-06
				Arsenic	7.6E-02	mg/L	2.7E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	4E-07	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	7E-03
				Barium	5.4E-01	mg/L	1.9E-06	mg/kg-day	NA	--	--	1.5E-05	mg/kg-day	1.4E-02	mg/kg-day	1E-03
				Cadmium	5.6E-04	mg/L	2.0E-09	mg/kg-day	NA	--	--	1.5E-08	mg/kg-day	2.5E-05	mg/kg-day	6E-04
				Chromium	2.3E-03	mg/L	1.7E-09	mg/kg-day	2.0E+02	(mg/kg-day) ⁻¹	3E-07	1.2E-07	mg/kg-day	7.5E-05	mg/kg-day	2E-03
				Cobalt	4.2E-04	mg/L	5.8E-10	mg/kg-day	NA	--	--	4.5E-09	mg/kg-day	3.0E-04	mg/kg-day	2E-05
				Iron	5.4E-01	mg/L	1.9E-06	mg/kg-day	NA	--	--	1.5E-05	mg/kg-day	7.0E-01	mg/kg-day	2E-05
				Manganese	3.2E-01	mg/L	1.1E-06	mg/kg-day	NA	--	--	8.6E-06	mg/kg-day	9.6E-04	mg/kg-day	9E-03
				Vanadium	7.4E-03	mg/L	2.6E-08	mg/kg-day	NA	--	--	2.0E-07	mg/kg-day	1.3E-04	mg/kg-day	2E-03
Exposure Route Total										2E-03					9E+01	

TABLE 7.5.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations						
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient		
							Value	Units	Value	Units		Value	Units	Value	Units			
Groundwater	Entire Aquifer	Bathroom Air	Inhalation	Benzene	1.7E+00	µg/m³	2.2E-03	µg/m³	7.8E-06	(µg/m³)⁻¹	2E-08	1.7E-02	µg/m³	3.0E+01	µg/m³	6E-04		
				Bromodichloromethane	9.8E-01	µg/m³	1.3E-03	µg/m³	3.7E-05	(µg/m³)⁻¹	5E-08	9.8E-03	µg/m³	NA	--	--		
				Chlorobenzene	8.9E+00	µg/m³	1.1E-02	µg/m³	NA	--	--	8.9E-02	µg/m³	5.0E+01	µg/m³	2E-03		
				Chloroform	6.7E+00	µg/m³	8.6E-03	µg/m³	2.3E-05	(µg/m³)⁻¹	2E-07	6.7E-02	µg/m³	9.8E+01	µg/m³	7E-04		
				Dibromochloromethane	8.3E-01	µg/m³	1.1E-03	µg/m³	2.7E-05	(µg/m³)⁻¹	3E-08	8.3E-03	µg/m³	NA	--	--		
				1,2-Dichlorobenzene	5.2E+00	µg/m³	6.7E-03	µg/m³	NA	--	--	5.2E-02	µg/m³	2.0E+02	µg/m³	3E-04		
				1,3-Dichlorobenzene	1.3E+01	µg/m³	1.6E-02	µg/m³	NA	--	--	1.3E-01	µg/m³	NA	--	--		
				1,4-Dichlorobenzene	1.2E+01	µg/m³	1.6E-02	µg/m³	1.1E-05	(µg/m³)⁻¹	2E-07	1.2E-01	µg/m³	8.0E+02	µg/m³	2E-04		
				1,1-Dichloroethane	1.7E+00	µg/m³	2.2E-03	µg/m³	1.6E-06	(µg/m³)⁻¹	3E-09	1.7E-02	µg/m³	NA	--	--		
				1,2-Dichloroethane	1.3E+00	µg/m³	1.7E-03	µg/m³	2.6E-05	(µg/m³)⁻¹	4E-08	1.3E-02	µg/m³	7.0E+00	µg/m³	2E-03		
				1,1-Dichloroethene	1.4E+01	µg/m³	1.8E-02	µg/m³	NA	--	--	1.4E-01	µg/m³	2.0E+02	µg/m³	7E-04		
				cis-1,2-Dichloroethene	3.4E+04	µg/m³	4.4E+01	µg/m³	NA	--	--	3.4E+02	µg/m³	NA	--	--		
				trans-1,2-Dichloroethene	1.5E+02	µg/m³	1.9E-01	µg/m³	NA	--	--	1.5E+00	µg/m³	6.0E+01	µg/m³	2E-02		
				Methyl tert-butyl ether	3.0E+01	µg/m³	3.9E-02	µg/m³	2.6E-07	(µg/m³)⁻¹	1E-08	3.0E-01	µg/m³	3.0E+03	µg/m³	1E-04		
				Methylene chloride	1.2E+00	µg/m³	1.6E-03	µg/m³	4.7E-07	(µg/m³)⁻¹	7E-10	1.2E-02	µg/m³	1.0E+03	µg/m³	1E-05		
				Tetrachloroethene	8.7E+01	µg/m³	1.1E-01	µg/m³	5.9E-06	(µg/m³)⁻¹	7E-07	8.7E-01	µg/m³	2.7E+02	µg/m³	3E-03		
				1,2,3-Trichlorobenzene	2.0E+01	µg/m³	2.6E-02	µg/m³	NA	--	--	2.0E-01	µg/m³	NA	--	--		
				1,2,4-Trichlorobenzene	1.4E+02	µg/m³	1.8E-01	µg/m³	NA	--	--	1.4E+00	µg/m³	2.0E+00	µg/m³	7E-01		
				1,1,2-Trichloroethane	9.4E+00	µg/m³	1.2E-02	µg/m³	1.6E-05	(µg/m³)⁻¹	2E-07	9.4E-02	µg/m³	NA	--	--		
				Trichloroethene	1.7E+04	µg/m³	2.2E+01	µg/m³	2.0E-06	(µg/m³)⁻¹	4E-05	1.7E+02	µg/m³	NA	--	--		
				Vinyl chloride	1.3E+02	µg/m³	1.6E-01	µg/m³	8.8E-06	(µg/m³)⁻¹	1E-06	1.3E+00	µg/m³	1.0E+02	µg/m³	1E-02		
				Naphthalene	8.2E-01	µg/m³	1.1E-03	µg/m³	3.4E-05	(µg/m³)⁻¹	4E-08	8.2E-03	µg/m³	3.0E+00	µg/m³	3E-03		
								Exposure Route Total						5E-05				8E-01
								Exposure Point Total						2E-03				2E+02
								Total of Receptor Risks Across Medium						2E-03				2E+02

Notes
Cancer risks for the resident adult were calculated as 9 years at the adult's rate of exposure.
N/A - Not Applicable
NA - Not Available

TABLE 7.6.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Tap Water	Ingestion	Benzene	7.2E-04	mg/L	2E-06	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	1E-07	2E-05	mg/kg-day	4.0E-03	mg/kg-day	6E-03
				Bromodichloromethane	4.1E-04	mg/L	1E-06	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	7E-08	1E-05	mg/kg-day	2.0E-02	mg/kg-day	6E-04
				Chlorobenzene	3.7E-03	mg/L	1E-05	mg/kg-day	NA	--	--	1E-04	mg/kg-day	2.0E-02	mg/kg-day	6E-03
				Chloroform	2.8E-03	mg/L	8E-06	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	2E-07	9E-05	mg/kg-day	1.0E-02	mg/kg-day	9E-03
				Dibromochloromethane	3.4E-04	mg/L	9E-07	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	8E-08	1E-05	mg/kg-day	2.0E-02	mg/kg-day	5E-04
				1,2-Dichlorobenzene	2.1E-03	mg/L	6E-06	mg/kg-day	NA	--	--	7E-05	mg/kg-day	9.0E-02	mg/kg-day	8E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	1E-05	mg/kg-day	NA	--	--	2E-04	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	1E-05	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	7E-08	2E-04	mg/kg-day	7.0E-02	mg/kg-day	2E-03
				1,1-Dichloroethane	7.0E-04	mg/L	2E-06	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	1E-08	2E-05	mg/kg-day	2.0E-01	mg/kg-day	1E-04
				1,2-Dichloroethane	5.6E-04	mg/L	2E-06	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	1E-07	2E-05	mg/kg-day	NA	--	--
				1,1-Dichloroethene	5.7E-03	mg/L	2E-05	mg/kg-day	NA	--	--	2E-04	mg/kg-day	5.0E-02	mg/kg-day	4E-03
				cis-1,2-Dichloroethene	1.4E+01	mg/L	4E-02	mg/kg-day	NA	--	--	5E-01	mg/kg-day	2.0E-03	mg/kg-day	2E+02
				trans-1,2-Dichloroethene	6.1E-02	mg/L	2E-04	mg/kg-day	NA	--	--	2E-03	mg/kg-day	2.0E-02	mg/kg-day	1E-01
				Methyl tert-butyl ether	1.3E-02	mg/L	3E-05	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	6E-08	4E-04	mg/kg-day	NA	--	--
				Methylene chloride	5.0E-04	mg/L	1E-06	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	1E-08	2E-05	mg/kg-day	6.0E-02	mg/kg-day	3E-04
				Tetrachloroethene	3.6E-02	mg/L	1E-04	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	5E-05	1E-03	mg/kg-day	1.0E-02	mg/kg-day	1E-01
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	2E-05	mg/kg-day	NA	--	--	3E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	2E-04	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	5E-06	2E-03	mg/kg-day	1.0E-02	mg/kg-day	2E-01
				1,1,2-Trichloroethane	3.9E-03	mg/L	1E-05	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	6E-07	1E-04	mg/kg-day	4.0E-03	mg/kg-day	3E-02
				Trichloroethene	7.0E+00	mg/L	2E-02	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	1E-04	2E-01	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	1E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	2E-04	2E-03	mg/kg-day	3.0E-03	mg/kg-day	6E-01
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	2E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	2E-07	2E-04	mg/kg-day	2.0E-02	mg/kg-day	9E-03
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	1E-07	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	1E-05	5E-06	mg/kg-day	NA	--	--
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	7E-08	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	1E-06	5E-06	mg/kg-day	NA	--	--
							6E-08	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	1E-07					
				Naphthalene	3.4E-04	mg/L	9E-07	mg/kg-day	NA	--	--	1E-05	mg/kg-day	2.0E-02	mg/kg-day	5E-04
				Total PCB Aroclors	4.4E-03	mg/L	1E-05	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	5E-06	1E-04	mg/kg-day	2.0E-05	mg/kg-day	7E+00
				gamma-Chlordane	1.1E-02	mg/L	3E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	1E-05	3E-04	mg/kg-day	5.0E-04	mg/kg-day	7E-01
				4,4'-DDD	1.6E-01	mg/L	4E-04	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	1E-04	5E-03	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	1E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	4E-05	2E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	3E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	1E-04	4E-03	mg/kg-day	5.0E-04	mg/kg-day	8E+00
				Heptachlor	9.7E-03	mg/L	3E-05	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	1E-04	3E-04	mg/kg-day	5.0E-04	mg/kg-day	6E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	7E-11	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	1E-05	8E-10	mg/kg-day	1.0E-09	mg/kg-day	8E-01
				Aluminum	2.7E-01	mg/L	7E-04	mg/kg-day	NA	--	--	9E-03	mg/kg-day	1.0E+00	mg/kg-day	9E-03
				Arsenic	7.6E-02	mg/L	2E-04	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	3E-04	2E-03	mg/kg-day	3.0E-04	mg/kg-day	8E+00
				Barium	5.4E-01	mg/L	1E-03	mg/kg-day	NA	--	--	2E-02	mg/kg-day	2.0E-01	mg/kg-day	9E-02
				Cadmium	5.6E-04	mg/L	2E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	5.0E-04	mg/kg-day	4E-02
				Chromium ^	2.3E-03	mg/L	2E-06	mg/kg-day	5.0E+00	(mg/kg-day) ⁻¹	9E-06	7E-05	mg/kg-day	3.0E-03	mg/kg-day	2E-02
							9E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	1E-06					
				Cobalt	4.2E-04	mg/L	1E-06	mg/kg-day	NA	--	--	1E-05	mg/kg-day	3.0E-04	mg/kg-day	4E-02
				Iron	5.4E-01	mg/L	1E-03	mg/kg-day	NA	--	--	2E-02	mg/kg-day	7.0E-01	mg/kg-day	2E-02
				Manganese	3.2E-01	mg/L	9E-04	mg/kg-day	NA	--	--	1E-02	mg/kg-day	2.4E-02	mg/kg-day	4E-01
				Vanadium	7.4E-03	mg/L	2E-05	mg/kg-day	NA	--	--	2E-04	mg/kg-day	5.0E-03	mg/kg-day	5E-02
				Exposure Route Total										1E-03		

TABLE 7.6.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Entire Aquifer	Shower	Dermal Absorption	Benzene	7.2E-04	mg/L	1E-07	mg/kg-day	5.5E-02	(mg/kg-day) ⁻¹	6E-09	1E-06	mg/kg-day	4.0E-03	mg/kg-day	5E-09
				Bromodichloromethane	4.1E-04	mg/L	N/A	mg/kg-day	6.2E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Chlorobenzene	3.7E-03	mg/L	1E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	2.0E-02	mg/kg-day	8E-04
				Chloroform	2.8E-03	mg/L	N/A	mg/kg-day	3.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	1.0E-02	mg/kg-day	N/A
				Dibromochloromethane	3.4E-04	mg/L	N/A	mg/kg-day	8.4E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				1,2-Dichlorobenzene	2.1E-03	mg/L	1E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	9.0E-02	mg/kg-day	2E-04
				1,3-Dichlorobenzene	5.2E-03	mg/L	5E-06	mg/kg-day	NA	--	--	6E-05	mg/kg-day	NA	--	--
				1,4-Dichlorobenzene	5.0E-03	mg/L	3E-06	mg/kg-day	5.4E-03	(mg/kg-day) ⁻¹	2E-08	4E-05	mg/kg-day	7.0E-02	mg/kg-day	6E-04
				1,1-Dichloroethane	7.0E-04	mg/L	N/A	mg/kg-day	5.7E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	2.0E-01	mg/kg-day	N/A
				1,2-Dichloroethane	5.6E-04	mg/L	N/A	mg/kg-day	9.1E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				1,1-Dichloroethene	5.7E-03	mg/L	8E-07	mg/kg-day	NA	--	--	9E-06	mg/kg-day	5.0E-02	mg/kg-day	2E-04
				cis-1,2-Dichloroethene	1.4E+01	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-03	mg/kg-day	N/A
				trans-1,2-Dichloroethene	6.1E-02	mg/L	N/A	mg/kg-day	NA	--	N/A	N/A	mg/kg-day	2.0E-02	mg/kg-day	N/A
				Methyl tert-butyl ether	1.3E-02	mg/L	N/A	mg/kg-day	1.8E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	NA	--	N/A
				Methylene chloride	5.0E-04	mg/L	N/A	mg/kg-day	7.5E-03	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	6.0E-02	mg/kg-day	N/A
				Tetrachloroethene	3.6E-02	mg/L	2E-05	mg/kg-day	5.4E-01	(mg/kg-day) ⁻¹	1E-05	3E-04	mg/kg-day	1.0E-02	mg/kg-day	3E-02
				1,2,3-Trichlorobenzene	8.5E-03	mg/L	1E-05	mg/kg-day	NA	--	--	1E-04	mg/kg-day	NA	--	--
				1,2,4-Trichlorobenzene	5.8E-02	mg/L	8E-05	mg/kg-day	2.9E-02	(mg/kg-day) ⁻¹	2E-06	9E-04	mg/kg-day	1.0E-02	mg/kg-day	9E-02
				1,1,2-Trichloroethane	3.9E-03	mg/L	N/A	mg/kg-day	5.7E-02	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	4.0E-03	mg/kg-day	N/A
				Trichloroethene	7.0E+00	mg/L	1E-03	mg/kg-day	5.9E-03	(mg/kg-day) ⁻¹	7E-06	1E-02	mg/kg-day	NA	--	--
				Vinyl chloride	5.3E-02	mg/L	N/A	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	N/A	N/A	mg/kg-day	3.0E-03	mg/kg-day	N/A
				bis(2-Ethylhexyl)phthalate	5.7E-03	mg/L	2E-05	mg/kg-day	1.4E-02	(mg/kg-day) ⁻¹	3E-07	2E-04	mg/kg-day	2.0E-02	mg/kg-day	1E-02
				Dibenzo(a,h)anthracene ^	1.7E-04	mg/L	2E-06	mg/kg-day	7.3E+01	(mg/kg-day) ⁻¹	2E-04	1E-04	mg/kg-day	NA	--	--
							2E-06	mg/kg-day	2.2E+01	(mg/kg-day) ⁻¹	4E-05					
				Indeno(1,2,3-cd)pyrene ^	1.4E-04	mg/L	1E-06	mg/kg-day	7.3E+00	(mg/kg-day) ⁻¹	9E-06	8E-05	mg/kg-day	NA	--	--
							1E-06	mg/kg-day	2.2E+00	(mg/kg-day) ⁻¹	2E-06					
				Naphthalene	3.4E-04	mg/L	2E-07	mg/kg-day	NA	--	--	3E-06	mg/kg-day	2.0E-02	mg/kg-day	1E-04
				Total PCB Aroclors	4.4E-03	mg/L	2E-04	mg/kg-day	4.0E-01	(mg/kg-day) ⁻¹	7E-05	2E-03	mg/kg-day	2.0E-05	mg/kg-day	1E+02
				gamma-Chlordane	1.1E-02	mg/L	5E-05	mg/kg-day	3.5E-01	(mg/kg-day) ⁻¹	2E-05	6E-04	mg/kg-day	5.0E-04	mg/kg-day	1E+00
				4,4'-DDD	1.6E-01	mg/L	2E-03	mg/kg-day	2.4E-01	(mg/kg-day) ⁻¹	6E-04	3E-02	mg/kg-day	NA	--	--
				4,4'-DDE	4.8E-02	mg/L	6E-04	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	2E-04	7E-03	mg/kg-day	NA	--	--
				4,4'-DDT	1.2E-01	mg/L	3E-03	mg/kg-day	3.4E-01	(mg/kg-day) ⁻¹	1E-03	3E-02	mg/kg-day	5.0E-04	mg/kg-day	7E+01
				Heptachlor	9.7E-03	mg/L	9E-06	mg/kg-day	4.5E+00	(mg/kg-day) ⁻¹	4E-05	1E-04	mg/kg-day	5.0E-04	mg/kg-day	2E-01
				2,3,7,8-TCDD Toxic Equivalence	2.6E-08	mg/L	1E-09	mg/kg-day	1.6E+05	(mg/kg-day) ⁻¹	2E-04	1E-08	mg/kg-day	1.0E-09	mg/kg-day	1E+01
				Aluminum	2.7E-01	mg/L	1E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	1.0E+00	mg/kg-day	2E-05
				Arsenic	7.6E-02	mg/L	4E-07	mg/kg-day	1.5E+00	(mg/kg-day) ⁻¹	6E-07	5E-06	mg/kg-day	3.0E-04	mg/kg-day	2E-02
				Barium	5.4E-01	mg/L	3E-06	mg/kg-day	NA	--	--	3E-05	mg/kg-day	1.4E-02	mg/kg-day	2E-03
				Cadmium	5.6E-04	mg/L	3E-09	mg/kg-day	NA	--	--	4E-08	mg/kg-day	2.5E-05	mg/kg-day	1E-03
				Chromium ^	2.3E-03	mg/L	5E-09	mg/kg-day	2.0E+02	(mg/kg-day) ⁻¹	9E-07	3E-07	mg/kg-day	7.5E-05	mg/kg-day	4E-03
							4E-09		6.0E+01		2E-07					
				Cobalt	4.2E-04	mg/L	9E-10	mg/kg-day	NA	--	--	1E-08	mg/kg-day	3.0E-04	mg/kg-day	4E-05
				Iron	5.4E-01	mg/L	3E-06	mg/kg-day	NA	--	--	3E-05	mg/kg-day	7.0E-01	mg/kg-day	5E-05
				Manganese	3.2E-01	mg/L	2E-06	mg/kg-day	NA	--	--	2E-05	mg/kg-day	9.6E-04	mg/kg-day	2E-02
				Vanadium	7.4E-03	mg/L	4E-08	mg/kg-day	NA	--	--	5E-07	mg/kg-day	1.3E-04	mg/kg-day	4E-03
Exposure Route Total								2E-03						2E+02		

TABLE 7.6.CT
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations					
					Value	Units	Intake / Exposure Concentration		Cancer Slope Factor / Unit Risk		Cancer Risk	Intake / Exposure Concentration		Reference Dose / Reference Concentration		Hazard Quotient	
							Value	Units	Value	Units		Value	Units	Value	Units		
Groundwater	Entire Aquifer	Bathroom Air	Inhalation	Benzene	2.4E+00	µg/m³	3E-03	µg/m³	7.8E-06	(µg/m³)⁻¹	2E-08	3E-02	µg/m³	3.0E+01	µg/m³	1E-03	
				Bromodichloromethane	1.3E+00	µg/m³	1E-03	µg/m³	3.7E-05	(µg/m³)⁻¹	6E-08	2E-02	µg/m³	NA	--	--	
				Chlorobenzene	1.2E+01	µg/m³	1E-02	µg/m³	NA	--	--	2E-01	µg/m³	5.0E+01	µg/m³	3E-03	
				Chloroform	9.1E+00	µg/m³	1E-02	µg/m³	2.3E-05	(µg/m³)⁻¹	2E-07	1E-01	µg/m³	9.8E+01	µg/m³	1E-03	
				Dibromochloromethane	1.1E+00	µg/m³	1E-03	µg/m³	2.7E-05	(µg/m³)⁻¹	3E-08	1E-02	µg/m³	NA	--	--	
				1,2-Dichlorobenzene	7.0E+00	µg/m³	8E-03	µg/m³	NA	--	--	9E-02	µg/m³	2.0E+02	µg/m³	5E-04	
				1,3-Dichlorobenzene	1.7E+01	µg/m³	2E-02	µg/m³	NA	--	--	2E-01	µg/m³	NA	--	--	
				1,4-Dichlorobenzene	1.6E+01	µg/m³	2E-02	µg/m³	1.1E-05	(µg/m³)⁻¹	2E-07	2E-01	µg/m³	8.0E+02	µg/m³	3E-04	
				1,1-Dichloroethane	2.3E+00	µg/m³	3E-03	µg/m³	1.6E-06	(µg/m³)⁻¹	4E-09	3E-02	µg/m³	NA	--	--	
				1,2-Dichloroethane	1.8E+00	µg/m³	2E-03	µg/m³	2.6E-05	(µg/m³)⁻¹	5E-08	2E-02	µg/m³	7.0E+00	µg/m³	3E-03	
				1,1-Dichloroethene	1.9E+01	µg/m³	2E-02	µg/m³	NA	--	--	2E-01	µg/m³	2.0E+02	µg/m³	1E-03	
				cis-1,2-Dichloroethene	4.6E+04	µg/m³	5E+01	µg/m³	NA	--	--	6E+02	µg/m³	NA	--	--	
				trans-1,2-Dichloroethene	2.0E+02	µg/m³	2E-01	µg/m³	NA	--	--	3E+00	µg/m³	6.0E+01	µg/m³	4E-02	
				Methyl tert-butyl ether	4.1E+01	µg/m³	5E-02	µg/m³	2.6E-07	(µg/m³)⁻¹	1E-08	5E-01	µg/m³	3.0E+03	µg/m³	2E-04	
				Methylene chloride	1.6E+00	µg/m³	2E-03	µg/m³	4.7E-07	(µg/m³)⁻¹	9E-10	2E-02	µg/m³	1.0E+03	µg/m³	2E-05	
				Tetrachloroethene	1.2E+02	µg/m³	1E-01	µg/m³	5.9E-06	(µg/m³)⁻¹	8E-07	2E+00	µg/m³	2.7E+02	µg/m³	6E-03	
				1,2,3-Trichlorobenzene	2.8E+01	µg/m³	3E-02	µg/m³	NA	--	--	4E-01	µg/m³	NA	--	--	
				1,2,4-Trichlorobenzene	1.9E+02	µg/m³	2E-01	µg/m³	NA	--	--	3E+00	µg/m³	2.0E+00	µg/m³	1E+00	
				1,1,2-Trichloroethane	1.3E+01	µg/m³	1E-02	µg/m³	1.6E-05	(µg/m³)⁻¹	2E-07	2E-01	µg/m³	NA	--	--	
				Trichloroethene	2.3E+04	µg/m³	3E+01	µg/m³	2.0E-06	(µg/m³)⁻¹	5E-05	3E+02	µg/m³	NA	--	--	
				Vinyl chloride	1.7E+02	µg/m³	2E-01	µg/m³	8.8E-06	(µg/m³)⁻¹	2E-06	2E+00	µg/m³	1.0E+02	µg/m³	2E-02	
				Naphthalene	1.1E+00	µg/m³	1E-03	µg/m³	3.4E-05	(µg/m³)⁻¹	4E-08	1E-02	µg/m³	3.0E+00	µg/m³	5E-03	
			Exposure Route Total											6E-05			
		Exposure Point Total											3E-03				4E+02
	Total of Receptor Risks Across Medium											3E-03				4E+02	

Notes
^ To calculate cancer risks for these carcinogenic COPCs with a mutagenic mode of action, age-dependent adjustment factors (ADAF) were applied to the cancer slope factors. For the resident child, an ADAF of 10 was used to evaluate exposure between the ages of 0-2; an ADAF of 3 was used to evaluate exposure between the ages of 2-6. To facilitate application of the ADAFs, intakes and dermally absorbed doses were calculated for each of the corresponding age groups, and the appropriate ADAF was applied to the cancer slope factor.
N/A - Not Applicable
NA - Not Available

TABLE 9.1.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Process Water	Benzene	N/A	1E-06	5E-08		1E-06	Blood	N/A	1E-02	6E-04	1E-02
			Bromodichloromethane	N/A	3E-06	1E-08		3E-06	Kidney	N/A	--	3E-05	3E-05
			Chlorobenzene	N/A	--	--		--	Kidney; Liver	N/A	4E-02	1E-03	4E-02
			Chloroform	N/A	1E-05	5E-08		1E-05	Liver	N/A	1E-02	5E-04	1E-02
			Dibromochloromethane	N/A	2E-06	1E-08		2E-06	Liver	N/A	--	2E-05	2E-05
			1,2-Dichlorobenzene	N/A	--	--		--	Developmental	N/A	5E-03	2E-04	6E-03
			1,3-Dichlorobenzene	N/A	--	--		--	--	N/A	--	--	--
			1,4-Dichlorobenzene	N/A	1E-05	1E-07		1E-05	Liver	N/A	3E-03	7E-04	4E-03
			1,1-Dichloroethane	N/A	2E-07	2E-09		2E-07	Kidney; Neurological	N/A	--	6E-06	6E-06
			1,2-Dichloroethane	N/A	3E-06	2E-08		3E-06	Neurological	N/A	4E-02	--	4E-02
			1,1-Dichloroethene	N/A	--	--		--	Liver	N/A	1E-02	3E-04	1E-02
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	1E+01	1E+01
			trans-1,2-Dichloroethene	N/A	--	--		--	Blood; Liver; Respiratory	N/A	5E-01	6E-03	5E-01
			Methyl tert-butyl ether	N/A	6E-07	4E-09		6E-07	Kidney; Liver	N/A	2E-03	--	2E-03
			Methylene chloride	N/A	4E-08	1E-09		4E-08	Liver	N/A	2E-04	7E-06	3E-04
			Tetrachloroethene	N/A	4E-05	6E-05		1E-04	Liver; Neurological	N/A	7E-02	3E-02	1E-01
			1,2,3-Trichlorobenzene	N/A	--	--		--	--	N/A	--	--	--
			1,2,4-Trichlorobenzene	N/A	--	1E-05		1E-05	Kidney; Blood	N/A	1E+01	1E-01	1E+01
			1,1,2-Trichloroethane	N/A	1E-05	1E-07		1E-05	Blood	N/A	--	2E-03	2E-03
			Trichloroethene	N/A	2E-03	4E-05		3E-03	--	N/A	--	--	--
			Vinyl chloride	N/A	4E-05	2E-05		6E-05	Liver	N/A	3E-01	2E-02	3E-01
			bis(2-Ethylhexyl)phthalate	N/A	N/A	6E-07		6E-07	Liver	N/A	N/A	6E-03	6E-03
			Dibenzo(a,h)anthracene	N/A	N/A	2E-04		2E-04	--	N/A	N/A	--	--
			Indeno(1,2,3-cd)pyrene	N/A	N/A	1E-05		1E-05	--	N/A	N/A	--	--
			Naphthalene	N/A	2E-06	--		2E-06	Developmental	N/A	6E-02	2E-04	6E-02
			Total PCB Aroclors	N/A	N/A	2E-04		2E-04	Eye; Developmental; Immunological	N/A	N/A	6E+01	6E+01
			gamma-Chlordane	N/A	N/A	4E-05		4E-05	Liver	N/A	N/A	7E-01	7E-01
			4,4'-DDD	N/A	N/A	1E-03		1E-03	--	N/A	N/A	--	--
			4,4'-DDE	N/A	N/A	5E-04		5E-04	--	N/A	N/A	--	--
			4,4'-DDT	N/A	N/A	2E-03		2E-03	Liver	N/A	N/A	4E+01	4E+01
			Heptachlor	N/A	N/A	1E-04		1E-04	Liver	N/A	N/A	1E-01	1E-01
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	4E-04		4E-04	Developmental	N/A	N/A	7E+00	7E+00
			Aluminum	N/A	N/A	--		--	Neurological	N/A	N/A	7E-05	7E-05
			Arsenic	N/A	N/A	1E-05		1E-05	Skin; Developmental; Cardiovascular; Neurological	N/A	N/A	7E-02	7E-02
			Barium	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	1E-02	1E-02
			Cadmium	N/A	N/A	--		--	Kidney	N/A	N/A	6E-03	6E-03
			Chromium	N/A	N/A	8E-06		8E-06	Respiratory	N/A	N/A	2E-02	2E-02
			Cobalt	N/A	N/A	--		--	Endocrine; Respiratory	N/A	N/A	1E-04	1E-04
			Iron	N/A	N/A	--		--	GI tract	N/A	N/A	2E-04	2E-04
			Manganese	N/A	N/A	--		--	Neurological	N/A	N/A	9E-02	9E-02
			Vanadium	N/A	N/A	--		--	--	N/A	N/A	1E-02	1E-02
			Chemical Total	--	3E-03	5E-03		8E-03		--	2E+01	1E+02	1E+02
		Exposure Point Total						8E-03					1E+02
	Exposure Medium Total							8E-03					1E+02
Medium Total								8E-03					1E+02
Receptor Total								8E-03					1E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	2E+01
Kidney HI Across All Media =	3E+01
Liver HI Across All Media =	4E+01
Developmental HI Across All Media =	6E+01
Neurological HI Across All Media =	3E-01
Respiratory HI Across All Media =	5E-01
Eye HI Across All Media =	6E+01
Immunological HI Across All Media =	6E+01
Skin HI Across All Media =	7E-02
Cardiovascular HI Across All Media =	7E-02
Endocrine HI Across All Media =	1E-04
GI tract HI Across All Media =	2E-04

TABLE 9.2.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Shallow Onsite Groundwater
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	Benzene	N/A	3E-11	2E-09		2E-09	Blood	N/A	1E-05	1E-03	1E-03		
			Chlorobenzene	N/A	--	--	--	Kidney; Liver; GI tract; Blood	N/A	9E-06	2E-03	2E-03			
			Chloroform	N/A	6E-11	6E-10	7E-10	Liver	N/A	4E-06	6E-05	6E-05			
			1,2-Dibromo-3-chloropropane	N/A	2E-10	6E-10	8E-10	Reproductive	N/A	6E-06	1E-04	1E-04			
			Dibromochloromethane	N/A	1E-11	2E-10	2E-10	Liver	N/A	--	1E-05	1E-05			
			1,2-Dichlorobenzene	N/A	--	--	--	Liver	N/A	1E-06	1E-04	1E-04			
			1,3-Dichlorobenzene	N/A	--	--	--	Endocrine	N/A	--	1E-02	1E-02			
			1,4-Dichlorobenzene	N/A	2E-10	4E-09	4E-09	Liver	N/A	2E-06	3E-03	3E-03			
			1,1-Dichloroethane	N/A	5E-12	1E-10	1E-10	Kidney; Neurological	N/A	--	3E-06	3E-06			
			1,2-Dichloroethane	N/A	1E-10	2E-09	2E-09	Kidney; Neurological	N/A	2E-05	3E-04	3E-04			
			1,1-Dichloroethene	N/A	--	--	--	Liver	N/A	1E-04	5E-03	5E-03			
			cis-1,2-Dichloroethene	N/A	--	--	--	Kidney	N/A	--	2E+01	2E+01			
			trans-1,2-Dichloroethene	N/A	--	--	--	Blood; Liver	N/A	3E-04	7E-03	7E-03			
			Ethylbenzene	N/A	3E-11	5E-09	5E-09	Liver	N/A	4E-07	1E-03	1E-03			
			Methylcyclohexane	N/A	--	--	--	Kidney	N/A	7E-07	--	7E-07			
			Methylene chloride	N/A	4E-12	2E-10	2E-10	Liver	N/A	3E-06	1E-04	1E-04			
			Tetrachloroethene	N/A	3E-09	1E-05	1E-05	Liver	N/A	5E-04	6E-02	6E-02			
			1,2,3-Trichlorobenzene	N/A	--	--	--	Developmental; Liver; Endocrine	N/A	--	2E-01	2E-01			
			1,2,4-Trichlorobenzene	N/A	--	3E-07	3E-07	Kidney; Blood	N/A	2E-03	4E-02	4E-02			
			1,1,2-Trichloroethane	N/A	2E-10	5E-09	5E-09	Liver	N/A	--	7E-03	7E-03			
			Trichloroethene	N/A	4E-08	2E-06	2E-06	--	N/A	--	--	--			
			o-Xylene	N/A	--	--	--	Developmental	N/A	3E-05	1E-03	1E-03			
			Vinyl chloride	N/A	1E-09	6E-07	6E-07	Liver	N/A	7E-04	9E-02	9E-02			
			Benzo(a)anthracene	N/A	N/A	3E-07	3E-07	--	N/A	N/A	--	--			
			Benzo(a)pyrene	N/A	N/A	3E-06	3E-06	--	N/A	N/A	--	--			
			Benzo(b)fluoranthene	N/A	N/A	2E-06	2E-06	--	N/A	N/A	--	--			
			Benzo(g,h,i)perylene	N/A	N/A	--	--	--	N/A	N/A	--	--			
			Benzo(k)fluoranthene	N/A	N/A	5E-08	5E-08	--	N/A	N/A	--	--			
			1,1-Biphenyl	N/A	N/A	--	--	Kidney; Developmental	N/A	N/A	7E-04	7E-04			
			Dibenzo(a,h)anthracene	N/A	N/A	2E-05	2E-05	--	N/A	N/A	--	--			
			Indeno(1,2,3-cd)pyrene	N/A	N/A	3E-07	3E-07	--	N/A	N/A	--	--			
			Naphthalene	N/A	6E-11	--	6E-11	Developmental	N/A	2E-04	1E-04	3E-04			
			Phenanthrene	N/A	--	--	--	--	N/A	--	--	--			
			Total PCB Aroclors	N/A	N/A	4E-06	4E-06	Eye; Developmental; Immunological	N/A	N/A	5E+01	5E+01			
			alpha-BHC	N/A	N/A	6E-08	6E-08	--	N/A	N/A	4E-04	4E-04			
			delta-BHC	N/A	N/A	--	--	--	N/A	N/A	--	--			
			gamma-BHC	N/A	N/A	4E-09	4E-09	Kidney; Liver	N/A	N/A	4E-04	4E-04			
			gamma-Chlordane	N/A	N/A	8E-08	8E-08	Liver	N/A	N/A	1E-01	1E-01			
			4,4'-DDD	N/A	N/A	5E-08	5E-08	--	N/A	N/A	--	--			
			4,4'-DDE	N/A	N/A	1E-07	1E-07	--	N/A	N/A	--	--			
			4,4'-DDT	N/A	N/A	8E-07	8E-07	Liver	N/A	N/A	1E+00	1E+00			
			Dieldrin	N/A	N/A	2E-07	2E-07	Neurological	N/A	N/A	5E-02	5E-02			
			Endosulfan II	N/A	N/A	--	--	--	N/A	N/A	7E-04	7E-04			
			Endosulfan sulfate	N/A	N/A	--	--	--	N/A	N/A	--	--			
			Endrin aldehyde	N/A	N/A	--	--	--	N/A	N/A	--	--			
			Heptachlor	N/A	N/A	9E-08	9E-08	--	N/A	N/A	1E-02	1E-02			
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	8E-06	8E-06	Immunological	N/A	N/A	8E-01	8E-01			
			Aluminum	N/A	N/A	--	--	Neurological	N/A	N/A	5E-04	5E-04			
			Arsenic	N/A	N/A	2E-07	2E-07	Skin, Developmental; Cardiovascular; Neurological	N/A	N/A	1E-01	1E-01			
			Barium	N/A	N/A	--	--	Kidney; Developmental	N/A	N/A	2E-02	2E-02			
			Cadmium	N/A	N/A	--	--	Musculoskeletal	N/A	N/A	4E-02	4E-02			
			Chromium	N/A	N/A	1E-06	1E-06	Respiratory	N/A	N/A	3E-02	3E-02			
			Cobalt	N/A	N/A	--	--	Endocrine; Respiratory	N/A	N/A	3E-05	3E-05			
			Iron	N/A	N/A	--	--	GI tract	N/A	N/A	1E-03	1E-03			
			Manganese	N/A	N/A	--	--	--	N/A	N/A	2E-01	2E-01			
			Vanadium	N/A	N/A	--	--	--	N/A	N/A	2E-02	2E-02			
			Chemical Total			--	5E-08	5E-05		5E-05		--	4E-03	7E+01	7E+01
			Exposure Point Total							5E-05					7E+01
			Exposure Medium Total							5E-05					7E+01
			Medium Total							5E-05					7E+01
			Receptor Total							5E-05					7E+01
						Receptor Risk Total				5E-05	Receptor HI Total				7E+01

Notes
N/A - Not Applicable

Blood HI Across All Media =	5E-02
Kidney HI Across All Media =	2E+01
Liver HI Across All Media =	2E+00
Developmental HI Across All Media =	5E+01
Neurological HI Across All Media =	2E-01
Respiratory HI Across All Media =	3E-05
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01
Skin HI Across All Media =	1E-01
Cardiovascular HI Across All Media =	1E-01
Endocrine HI Across All Media =	2E-01
GI tract HI Across All Media =	3E-03
Reproductive HI Across All Media =	1E-04
Musculoskeletal HI Across All Media =	4E-02

TABLE 9.3.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Shallow Offsite Groundwater, SBB
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Benzene	N/A	5E-12	4E-10		4E-10	Blood	N/A	2E-06	2E-04	2E-04
			Chloroform	N/A	3E-11	2E-10		3E-10	Liver	N/A	1E-06	2E-05	2E-05
			Dibromochloromethane	N/A	1E-11	2E-10		2E-10	Liver	N/A	--	9E-06	9E-06
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	2E-03	2E-03
			Methyl tert-butyl ether	N/A	6E-11	7E-10			Liver; Neurological	N/A	2E-05	4E-04	4E-04
			Tetrachloroethene	N/A	1E-11	3E-08		3E-08	Liver	N/A	2E-06	2E-04	2E-04
			Trichloroethene	N/A	2E-09	7E-08		8E-08	--	N/A	--	--	--
			Dibenzo(a,h)anthracene	N/A	N/A	3E-05		3E-05	--	N/A	N/A	--	--
			Indeno(1,2,3-cd)pyrene	N/A	N/A	8E-08		8E-08	--	N/A	N/A	--	--
			Naphthalene	N/A	4E-12	--		4E-12	Developmental	N/A	1E-05	8E-06	2E-05
			Total PCB Aroclors	N/A	N/A	2E-06		2E-06	Eye; Developmental; Immunological	N/A	N/A	2E+01	2E+01
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	2E-07		2E-07	Immunological	N/A	N/A	2E-02	2E-02
			Arsenic	N/A	N/A	5E-08		5E-08	Skin, Developmental; Cardiovascular; Neurological	N/A	N/A	3E-02	3E-02
			Barium	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	2E-01	2E-01
			Chromium	N/A	N/A	2E-08		2E-08	Respiratory	N/A	N/A	6E-04	6E-04
			Manganese	N/A	N/A	--		--	--	N/A	N/A	9E-02	9E-02
			Chemical Total			--	2E-09	3E-05		3E-05		--	4E-05
Exposure Point Total								3E-05					2E+01
Exposure Medium Total								3E-05					2E+01
Medium Total								3E-05					2E+01
Receptor Total			Receptor Risk Total					3E-05	Receptor HI Total				2E+01

Notes
N/A - Not Applicable

Blood HI Across All Media =	2E-04
Kidney HI Across All Media =	2E-01
Liver HI Across All Media =	6E-04
Developmental HI Across All Media =	2E+01
Neurological HI Across All Media =	3E-02
Respiratory HI Across All Media =	6E-04
Eye HI Across All Media =	2E+01
Immunological HI Across All Media =	2E+01
Skin HI Across All Media =	3E-02
Cardiovascular HI Across All Media =	3E-02

TABLE 9.4.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Benzene	N/A	1E-11	9E-10		9E-10	Blood	N/A	5E-06	4E-04	4E-04
			Bromodichloromethane	N/A	1E-11	1E-10		1E-10	Developmental; Kidney	N/A	5E-06	3E-05	3E-05
			Chloroform	N/A	3E-11	3E-10		3E-10	Liver	N/A	2E-06	3E-05	3E-05
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	6E-03	6E-03
			Tetrachloroethene	N/A	2E-12	7E-09		7E-09	Liver	N/A	4E-07	4E-05	4E-05
			Trichloroethene	N/A	5E-10	2E-08		2E-08	--	N/A	--	--	--
			Vinyl chloride	N/A	2E-12	1E-09		1E-09	Liver	N/A	2E-06	2E-04	2E-04
			Benzo(g,h,i)perylene	N/A	N/A	--		--	--	N/A	N/A	--	--
			bis(2-Ethylhexyl)phthalate	N/A	N/A	5E-09		5E-09	Liver	N/A	N/A	6E-04	6E-04
			Indeno(1,2,3-cd)pyrene	N/A	N/A	9E-08		9E-08	--	N/A	N/A	--	--
			Naphthalene	N/A	3E-12	--		3E-12	Developmental	N/A	1E-05	7E-06	2E-05
			Total PCB Aroclors	N/A	N/A	2E-07		2E-07	Eye; Developmental; Immunological	N/A	N/A	2E+00	2E+00
			beta-BHC	N/A	N/A	1E-08		--	Liver	N/A	N/A	4E-03	4E-03
			delta-BHC	N/A	N/A	--		--	--	N/A	N/A	--	--
			4,4'-DDD	N/A	N/A	6E-08		6E-08	--	N/A	N/A	--	--
			4,4'-DDE	N/A	N/A	7E-08		7E-08	--	N/A	N/A	--	--
			4,4'-DDT	N/A	N/A	2E-07		2E-07	Liver	N/A	N/A	3E-01	3E-01
			Heptachlor	N/A	N/A	2E-08		2E-08	--	N/A	N/A	3E-03	3E-03
			Antimony	N/A	N/A	--		--	Blood	N/A	N/A	1E-02	1E-02
			Arsenic	N/A	N/A	1E-07		1E-07	Skin; Developmental; Cardiovascular; Neurological	N/A	N/A	1E-01	1E-01
			Chromium	N/A	N/A	4E-08		4E-08	Respiratory	N/A	N/A	1E-03	1E-03
			Cobalt	N/A	N/A	--		--	Endocrine; Respiratory	N/A	N/A	2E-05	2E-05
			Manganese	N/A	N/A	--		--	--	N/A	N/A	2E-01	2E-01
			Vanadium	N/A	N/A	--		--	--	N/A	N/A	2E-02	2E-02
			Chemical Total	--	5E-10	8E-07		8E-07		--	2E-05	3E+00	3E+00
		Exposure Point Total						8E-07					3E+00
	Exposure Medium Total							8E-07					3E+00
Medium Total								8E-07					3E+00
Receptor Total								8E-07					3E+00
								Receptor Risk Total	Receptor HI Total				

Notes
N/A - Not Applicable

Blood HI Across All Media =	1E-02
Kidney HI Across All Media =	6E-03
Liver HI Across All Media =	3E-01
Developmental HI Across All Media =	2E+00
Neurological HI Across All Media =	1E-01
Respiratory HI Across All Media =	1E-03
Eye HI Across All Media =	2E+00
Immunological HI Across All Media =	2E+00
Skin HI Across All Media =	1E-01
Cardiovascular HI Across All Media =	1E-01
Endocrine HI Across All Media =	2E-05

TABLE 9.5.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Groundwater, Entire Aquifer
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	Benzene	6E-07	4E-07	N/A		1E-06	Blood	5E-03	3E-03	N/A	8E-03
			Bromodichloromethane	4E-07	1E-06	N/A		2E-06	Kidney	6E-04	--	N/A	6E-04
			Chlorobenzene	--	--	--		--	Kidney; Liver	5E-03	9E-03	1E-03	2E-02
			Chloroform	1E-06	5E-06	N/A		6E-06	Liver	8E-03	4E-03	N/A	1E-02
			Dibromochloromethane	4E-07	7E-07	N/A		1E-06	Liver	5E-04	--	N/A	5E-04
			1,2-Dichlorobenzene	--	--	--		--	Developmental	7E-04	1E-03	3E-04	2E-03
			1,3-Dichlorobenzene	--	--	--		--	--	--	--	--	--
			1,4-Dichlorobenzene	4E-07	4E-06	2E-07		5E-06	Liver	2E-03	8E-04	8E-04	4E-03
			1,1-Dichloroethane	6E-08	9E-08	N/A		1E-07	Kidney; Neurological	1E-04	--	N/A	1E-04
			1,2-Dichloroethane	8E-07	1E-06	N/A		2E-06	Neurological	--	1E-02	N/A	1E-02
			1,1-Dichloroethene	--	--	N/A		--	Liver	3E-03	4E-03	N/A	7E-03
			cis-1,2-Dichloroethene	--	--	N/A		--	Kidney	2E+02	--	N/A	2E+02
			trans-1,2-Dichloroethene	--	--	N/A		--	Blood; Liver; Respiratory	8E-02	1E-01	N/A	2E-01
			Methyl tert-butyl ether	3E-07	3E-07	N/A		6E-07	Kidney; Liver	--	5E-04	N/A	5E-04
			Methylene chloride	6E-08	2E-08	N/A		7E-08	Liver	2E-04	6E-05	N/A	3E-04
			Tetrachloroethene	3E-04	2E-05	1E-04		4E-04	Liver; Neurological	1E-01	2E-02	4E-02	2E-01
			1,2,3-Trichlorobenzene	--	--	--		--	--	--	--	--	--
			1,2,4-Trichlorobenzene	3E-05	--	2E-05		4E-05	Kidney; Blood	2E-01	4E+00	1E-01	4E+00
			1,1,2-Trichloroethane	3E-06	5E-06	N/A		8E-06	Blood	3E-02	--	N/A	3E-02
			Trichloroethene	6E-04	1E-03	6E-05		2E-03	--	--	--	--	--
			Vinyl chloride	1E-03	4E-05	N/A		1E-03	Liver	5E-01	7E-02	N/A	6E-01
			bis(2-Ethylhexyl)phthalate	1E-06	N/A	1E-06		2E-06	Liver	8E-03	N/A	8E-03	2E-02
			Dibenzo(a,h)anthracene	3E-05	N/A	3E-04		3E-04	--	--	N/A	--	--
			Indeno(1,2,3-cd)pyrene	2E-06	N/A	2E-05		2E-05	--	--	N/A	--	--
			Naphthalene	--	9E-07	--		9E-07	Developmental	5E-04	1E-02	2E-04	2E-02
			Total PCB Aroclors	3E-05	N/A	3E-04		4E-04	Eye; Developmental; Immunological	6E+00	N/A	8E+01	8E+01
			gamma-Chlordane	6E-05	N/A	8E-05		1E-04	Liver	6E-01	N/A	9E-01	1E+00
			4,4'-DDD	6E-04	N/A	3E-03		3E-03	--	--	N/A	--	--
			4,4'-DDE	2E-04	N/A	9E-04		1E-03	--	--	N/A	--	--
			4,4'-DDT	6E-04	N/A	5E-03		5E-03	Liver	7E+00	N/A	5E+01	6E+01
			Heptachlor	6E-04	N/A	2E-04		8E-04	Liver	5E-01	N/A	2E-01	7E-01
			2,3,7,8-TCDD Toxic Equivalence	6E-05	N/A	8E-04		9E-04	Developmental	7E-01	N/A	1E+01	1E+01
			Aluminum	--	N/A	--		--	Neurological	7E-03	N/A	2E-05	7E-03
			Arsenic	2E-03	N/A	4E-06		2E-03	Skin; Developmental; Cardiovascular; Neurological	7E+00	N/A	2E-02	7E+00
			Barium	--	N/A	--		--	Kidney; Developmental	7E-02	N/A	2E-03	8E-02
			Cadmium	--	N/A	--		--	Kidney	3E-02	N/A	1E-03	3E-02
			Chromium	2E-05	N/A	2E-06		3E-05	Respiratory	2E-02	N/A	4E-03	2E-02
			Cobalt	--	N/A	--		--	Endocrine; Respiratory	4E-02	N/A	3E-05	4E-02
			Iron	--	N/A	--		--	GI tract	2E-02	N/A	5E-05	2E-02
			Manganese	--	N/A	--		--	Neurological	4E-01	N/A	2E-02	4E-01
			Vanadium	--	N/A	--		--	--	4E-02	N/A	4E-03	4E-02
			Chemical Total	6E-03	1E-03	1E-02		2E-02		2E+02	4E+00	1E+02	4E+02
		Exposure Point Total						2E-02					4E+02
	Exposure Medium Total							2E-02					4E+02
Medium Total								2E-02					4E+02
Receptor Total								2E-02					4E+02
Receptor Risk Total									Receptor HI Total				

Notes
N/A - Not Applicable

Blood HI Across All Media =	4E+00
Kidney HI Across All Media =	2E+02
Liver HI Across All Media =	8E+01
Developmental HI Across All Media =	1E+02
Neurological HI Across All Media =	8E+00
Respiratory HI Across All Media =	3E-01
Eye HI Across All Media =	8E+01
Immunological HI Across All Media =	8E+01
Skin HI Across All Media =	7E+00
Cardiovascular HI Across All Media =	7E+00
Endocrine HI Across All Media =	4E-02
GI tract HI Across All Media =	2E-02

TABLE 9.6.RME
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	Benzene	2E-07	2E-07	N/A		4E-07	Blood	1E-02	9E-03	N/A	2E-02
			Bromodichloromethane	1E-07	5E-07	N/A		6E-07	Kidney	1E-03	--	N/A	1E-03
			Chlorobenzene	--	--	--		--	Kidney; Liver	1E-02	3E-02	2E-03	4E-02
			Chloroform	5E-07	2E-06	N/A		3E-06	Liver	2E-02	1E-02	N/A	3E-02
			Dibromochloromethane	2E-07	3E-07	N/A		5E-07	Liver	1E-03	--	N/A	1E-03
			1,2-Dichlorobenzene	--	--	--		--	Developmental	2E-03	4E-03	6E-04	6E-03
			1,3-Dichlorobenzene	--	--	--		--	--	--	--	--	--
			1,4-Dichlorobenzene	1E-07	2E-06	6E-08		2E-06	Liver	5E-03	2E-03	2E-03	9E-03
			1,1-Dichloroethane	2E-08	4E-08	N/A		6E-08	Kidney; Neurological	2E-04	--	N/A	2E-04
			1,2-Dichloroethane	3E-07	5E-07	N/A		8E-07	Neurological	--	3E-02	N/A	3E-02
			1,1-Dichloroethene	--	--	N/A		--	Liver	7E-03	1E-02	N/A	2E-02
			cis-1,2-Dichloroethene	--	--	N/A		--	Kidney	5E+02	--	N/A	5E+02
			trans-1,2-Dichloroethene	--	--	N/A		--	Blood; Liver; Respiratory	2E-01	4E-01	N/A	6E-01
			Methyl tert-butyl ether	1E-07	1E-07	N/A		2E-07	Kidney; Liver	--	2E-03	N/A	2E-03
			Methylene chloride	2E-08	8E-09	N/A		3E-08	Liver	5E-04	2E-04	N/A	7E-04
			Tetrachloroethene	1E-04	7E-06	4E-05		2E-04	Liver; Neurological	2E-01	5E-02	8E-02	4E-01
			1,2,3-Trichlorobenzene	--	--	--		--	--	--	--	--	--
			1,2,4-Trichlorobenzene	9E-06	--	7E-06		2E-05	Kidney; Blood	4E-01	1E+01	3E-01	1E+01
			1,1,2-Trichloroethane	1E-06	2E-06	N/A		3E-06	Blood	6E-02	--	N/A	6E-02
			Trichloroethene	2E-04	5E-04	2E-05		7E-04	--	--	--	--	--
			Vinyl chloride	4E-04	2E-05	N/A		5E-04	Liver	1E+00	2E-01	N/A	1E+00
			bis(2-Ethylhexyl)phthalate	4E-07	N/A	4E-07		9E-07	Liver	2E-02	N/A	2E-02	4E-02
			Dibenzo(a,h)anthracene	2E-05	N/A	3E-04		4E-04	--	--	N/A	--	--
			Indeno(1,2,3-cd)pyrene	2E-06	N/A	2E-05		2E-05	--	--	N/A	--	--
			Naphthalene	--	4E-07	--		4E-07	Developmental	1E-03	4E-02	4E-04	5E-02
			Total PCB Aroclors	1E-05	N/A	1E-04		1E-04	Eye; Developmental; Immunological	1E+01	N/A	2E+02	2E+02
			gamma-Chlordane	2E-05	N/A	3E-05		5E-05	Liver	1E+00	N/A	2E+00	3E+00
			4,4'-DDD	2E-04	N/A	1E-03		1E-03	--	--	N/A	--	--
			4,4'-DDE	9E-05	N/A	3E-04		4E-04	--	--	N/A	--	--
			4,4'-DDT	2E-04	N/A	2E-03		2E-03	Liver	2E+01	N/A	1E+02	1E+02
			Heptachlor	2E-04	N/A	7E-05		3E-04	Liver	1E+00	N/A	4E-01	2E+00
			2,3,7,8-TCDD Toxic Equivalence	2E-05	N/A	3E-04		3E-04	Developmental	2E+00	N/A	2E+01	2E+01
			Aluminum	--	N/A	--		--	Neurological	2E-02	N/A	5E-05	2E-02
			Arsenic	6E-04	N/A	2E-06		6E-04	Skin; Developmental; Cardiovascular; Neurological	2E+01	N/A	5E-02	2E+01
			Barium	--	N/A	--		--	Kidney; Developmental	2E-01	N/A	7E-03	2E-01
			Cadmium	--	N/A	--		--	Kidney	7E-02	N/A	4E-03	8E-02
			Chromium	2E-05	N/A	3E-06		2E-05	Respiratory	5E-02	N/A	1E-02	6E-02
			Cobalt	--	N/A	--		--	Endocrine; Respiratory	9E-02	N/A	1E-04	9E-02
			Iron	--	N/A	--		--	GI tract	5E-02	N/A	1E-04	5E-02
			Manganese	--	N/A	--		--	Neurological	8E-01	N/A	6E-02	9E-01
			Vanadium	--	N/A	--		--	--	9E-02	N/A	1E-02	1E-01
			Chemical Total	2E-03	5E-04	4E-03		7E-03		5E+02	1E+01	3E+02	8E+02
		Exposure Point Total						7E-03					8E+02
	Exposure Medium Total							7E-03					8E+02
Medium Total								7E-03					8E+02
Receptor Total								Receptor Risk Total 7E-03					Receptor HI Total 8E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	1E+01
Kidney HI Across All Media =	5E+02
Liver HI Across All Media =	1E+02
Developmental HI Across All Media =	2E+02
Neurological HI Across All Media =	2E+01
Respiratory HI Across All Media =	7E-01
Eye HI Across All Media =	2E+02
Immunological HI Across All Media =	2E+02
Skin HI Across All Media =	2E+01
Cardiovascular HI Across All Media =	2E+01
Endocrine HI Across All Media =	9E-02
GI tract HI Across All Media =	5E-02

TABLE 9.1.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Groundwater, Entire Aquifer
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Process Water	Benzene	N/A	1E-07	6E-09		2E-07	Blood	N/A	7E-03	3E-04	7E-03
			Bromodichloromethane	N/A	4E-07	1E-09		4E-07	Kidney	N/A	--	1E-05	1E-05
			Chlorobenzene	N/A	--	--		--	Kidney; Liver	N/A	2E-02	5E-04	2E-02
			Chloroform	N/A	2E-06	6E-09		2E-06	Liver	N/A	8E-03	2E-04	8E-03
			Dibromochloromethane	N/A	2E-07	1E-09		2E-07	Liver	N/A	--	8E-06	8E-06
			1,2-Dichlorobenzene	N/A	--	--		--	Developmental	N/A	3E-03	1E-04	3E-03
			1,3-Dichlorobenzene	N/A	--	--		--	--	N/A	--	--	--
			1,4-Dichlorobenzene	N/A	1E-06	1E-08		1E-06	Liver	N/A	2E-03	3E-04	2E-03
			1,1-Dichloroethane	N/A	3E-08	3E-10		3E-08	Kidney; Neurological	N/A	--	3E-06	3E-06
			1,2-Dichloroethane	N/A	4E-07	2E-09		4E-07	Neurological	N/A	2E-02	--	2E-02
			1,1-Dichloroethene	N/A	--	--		--	Liver	N/A	8E-03	1E-04	8E-03
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	6E+00	6E+00
			trans-1,2-Dichloroethene	N/A	--	--		--	Blood; Liver; Respiratory	N/A	3E-01	3E-03	3E-01
			Methyl tert-butyl ether	N/A	9E-08	5E-10		9E-08	Kidney; Liver	N/A	1E-03	--	1E-03
			Methylene chloride	N/A	6E-09	1E-10		6E-09	Liver	N/A	1E-04	3E-06	1E-04
			Tetrachloroethene	N/A	6E-06	7E-06		1E-05	Liver; Neurological	N/A	4E-02	1E-02	5E-02
			1,2,3-Trichlorobenzene	N/A	--	--		--	--	N/A	--	--	--
			1,2,4-Trichlorobenzene	N/A	--	1E-06		1E-06	Kidney; Blood	N/A	8E+00	5E-02	8E+00
			1,1,2-Trichloroethane	N/A	2E-06	2E-08		2E-06	Blood	N/A	--	7E-04	7E-04
			Trichloroethene	N/A	4E-04	5E-06		4E-04	--	N/A	--	--	--
			Vinyl chloride	N/A	6E-06	2E-06		8E-06	Liver	N/A	1E-01	1E-02	2E-01
			bis(2-Ethylhexyl)phthalate	N/A	N/A	1E-07		1E-07	Liver	N/A	N/A	5E-03	5E-03
			Dibenzo(a,h)anthracene	N/A	N/A	4E-05		4E-05	--	N/A	N/A	--	--
			Indeno(1,2,3-cd)pyrene	N/A	N/A	3E-06		3E-06	--	N/A	N/A	--	--
			Naphthalene	N/A	3E-07	--		3E-07	Developmental	N/A	3E-02	8E-05	3E-02
			Total PCB Aroclors	N/A	N/A	4E-05		4E-05	Eye; Developmental; Immunological	N/A	N/A	5E+01	5E+01
			gamma-Chlordane	N/A	N/A	9E-06		9E-06	Liver	N/A	N/A	6E-01	6E-01
			4,4'-DDD	N/A	N/A	3E-04		3E-04	--	N/A	N/A	--	--
			4,4'-DDE	N/A	N/A	1E-04		1E-04	--	N/A	N/A	--	--
			4,4'-DDT	N/A	N/A	5E-04		5E-04	Liver	N/A	N/A	3E+01	3E+01
			Heptachlor	N/A	N/A	2E-05		2E-05	Liver	N/A	N/A	1E-01	1E-01
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	9E-05		9E-05	Developmental	N/A	N/A	6E+00	6E+00
			Aluminum	N/A	N/A	--		--	Neurological	N/A	N/A	5E-05	5E-05
			Arsenic	N/A	N/A	2E-06		2E-06	Skin; Developmental; Cardiovascular; Neurological	N/A	N/A	5E-02	5E-02
			Barium	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	8E-03	8E-03
			Cadmium	N/A	N/A	--		--	Kidney	N/A	N/A	4E-03	4E-03
			Chromium	N/A	N/A	2E-06		2E-06	Respiratory	N/A	N/A	1E-02	1E-02
			Cobalt	N/A	N/A	--		--	Endocrine; Respiratory	N/A	N/A	1E-04	1E-04
			Iron	N/A	N/A	--		--	GI tract	N/A	N/A	1E-04	1E-04
			Manganese	N/A	N/A	--		--	Neurological	N/A	N/A	6E-02	6E-02
			Vanadium	N/A	N/A	--		--	--	N/A	N/A	1E-02	1E-02
			Chemical Total	--	4E-04	1E-03		2E-03		--	9E+00	9E+01	1E+02
		Exposure Point Total						2E-03					1E+02
	Exposure Medium Total							2E-03					1E+02
Medium Total								2E-03					1E+02
Receptor Total								2E-03					1E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	8E+00
Kidney HI Across All Media =	1E+01
Liver HI Across All Media =	3E+01
Developmental HI Across All Media =	6E+01
Neurological HI Across All Media =	2E-01
Respiratory HI Across All Media =	3E-01
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01
Skin HI Across All Media =	5E-02
Cardiovascular HI Across All Media =	5E-02
Endocrine HI Across All Media =	1E-04
GI tract HI Across All Media =	1E-04

TABLE 9.2.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	Benzene	N/A	7E-12	6E-10		6E-10	Blood	N/A	1E-05	9E-04	9E-04		
			Chlorobenzene	N/A	--	--		--	Kidney; Liver; GI tract; Blood	N/A	7E-06	2E-03	2E-03		
			Chloroform	N/A	2E-11	2E-10		2E-10	Liver	N/A	3E-06	5E-05	5E-05		
			1,2-Dibromo-3-chloropropane	N/A	6E-11	2E-10		2E-10	Reproductive	N/A	5E-06	1E-04	1E-04		
			Dibromochloromethane	N/A	3E-12	5E-11		5E-11	Liver	N/A	--	8E-06	8E-06		
			1,2-Dichlorobenzene	N/A	--	--		--	Liver	N/A	8E-07	1E-04	1E-04		
			1,3-Dichlorobenzene	N/A	--	--		--	Endocrine	N/A	--	1E-02	1E-02		
			1,4-Dichlorobenzene	N/A	5E-11	1E-09		1E-09	Liver	N/A	2E-06	3E-03	3E-03		
			1,1-Dichloroethane	N/A	1E-12	3E-11		3E-11	Kidney; Neurological	N/A	--	2E-06	2E-06		
			1,2-Dichloroethane	N/A	3E-11	4E-10		5E-10	Kidney; Neurological	N/A	2E-05	2E-04	2E-04		
			1,1-Dichloroethene	N/A	--	--		--	Liver	N/A	9E-05	4E-03	4E-03		
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	1E+01	1E+01		
			trans-1,2-Dichloroethene	N/A	--	--		--	Blood; Liver	N/A	2E-04	5E-03	6E-03		
			Ethylbenzene	N/A	7E-12	1E-09		1E-09	Liver	N/A	3E-07	1E-03	1E-03		
			Methylcyclohexane	N/A	--	--		--	Kidney	N/A	5E-07	--	5E-07		
			Methylene chloride	N/A	1E-12	4E-11		5E-11	Liver	N/A	2E-06	1E-04	1E-04		
			Tetrachloroethene	N/A	7E-10	3E-06		3E-06	Liver	N/A	4E-04	5E-02	5E-02		
			1,2,3-Trichlorobenzene	N/A	--	--		--	Developmental; Liver; Endocrine	N/A	--	2E-01	2E-01		
			1,2,4-Trichlorobenzene	N/A	--	9E-08		9E-08	Kidney; Blood	N/A	2E-03	3E-02	3E-02		
			1,1,2-Trichloroethane	N/A	5E-11	1E-09		1E-09	Liver	N/A	--	6E-03	6E-03		
			Trichloroethene	N/A	1E-08	4E-07		4E-07	--	N/A	--	--	--		
			o-Xylene	N/A	--	--		--	Developmental	N/A	2E-05	1E-03	1E-03		
			Vinyl chloride	N/A	2E-10	2E-07		2E-07	Liver	N/A	5E-04	7E-02	7E-02		
			Benzo(a)anthracene	N/A	N/A	8E-08		8E-08	--	N/A	N/A	--	--		
			Benzo(a)pyrene	N/A	N/A	7E-07		7E-07	--	N/A	N/A	--	--		
			Benzo(b)fluoranthene	N/A	N/A	4E-07		4E-07	--	N/A	N/A	--	--		
			Benzo(g,h,i)perylene	N/A	N/A	--		--	--	N/A	N/A	--	--		
			Benzo(k)fluoranthene	N/A	N/A	2E-08		2E-08	--	N/A	N/A	--	--		
			1,1-Biphenyl	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	6E-04	6E-04		
			Dibenzo(a,h)anthracene	N/A	N/A	4E-06		4E-06	--	N/A	N/A	--	--		
			Indeno(1,2,3-cd)pyrene	N/A	N/A	8E-08		8E-08	--	N/A	N/A	--	--		
			Naphthalene	N/A	1E-11	--		1E-11	Developmental	N/A	1E-04	1E-04	2E-04		
			Phenanthrene	N/A	--	--		--	--	N/A	--	--	--		
			Total PCB Aroclors	N/A	N/A	1E-06		1E-06	Eye; Developmental; Immunological	N/A	N/A	5E+01	5E+01		
			alpha-BHC	N/A	N/A	2E-08		2E-08	--	N/A	N/A	4E-04	4E-04		
			delta-BHC	N/A	N/A	--		--	--	N/A	N/A	--	--		
			gamma-BHC	N/A	N/A	1E-09		1E-09	Kidney; Liver	N/A	N/A	3E-04	3E-04		
			gamma-Chlordane	N/A	N/A	2E-08		2E-08	Liver	N/A	N/A	1E-01	1E-01		
			4,4'-DDD	N/A	N/A	1E-08		1E-08	--	N/A	N/A	--	--		
			4,4'-DDE	N/A	N/A	4E-08		4E-08	--	N/A	N/A	--	--		
			4,4'-DDT	N/A	N/A	2E-07		2E-07	Liver	N/A	N/A	1E+00	1E+00		
			Dieldrin	N/A	N/A	7E-08		7E-08	Neurological	N/A	N/A	4E-02	4E-02		
			Endosulfan II	N/A	N/A	--		--	--	N/A	N/A	6E-04	6E-04		
			Endosulfan sulfate	N/A	N/A	--		--	--	N/A	N/A	--	--		
			Endrin aldehyde	N/A	N/A	--		--	--	N/A	N/A	--	--		
			Heptachlor	N/A	N/A	2E-08		2E-08	--	N/A	N/A	1E-02	1E-02		
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	2E-06		2E-06	Immunological	N/A	N/A	7E-01	7E-01		
			Aluminum	N/A	N/A	--		--	Neurological	N/A	N/A	4E-04	4E-04		
			Arsenic	N/A	N/A	5E-08		5E-08	Skin, Developmental; Cardiovascular; Neurological	N/A	N/A	1E-01	1E-01		
			Barium	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	1E-02	1E-02		
			Cadmium	N/A	N/A	--		--	Musculoskeletal	N/A	N/A	3E-02	3E-02		
			Chromium	N/A	N/A	3E-07		3E-07	Respiratory	N/A	N/A	3E-02	3E-02		
			Cobalt	N/A	N/A	--		--	Endocrine; Respiratory	N/A	N/A	3E-05	3E-05		
			Iron	N/A	N/A	--		--	GI tract	N/A	N/A	8E-04	8E-04		
			Manganese	N/A	N/A	--		--	--	N/A	N/A	2E-01	2E-01		
			Vanadium	N/A	N/A	--		--	--	N/A	N/A	1E-02	1E-02		
					Chemical Total	--	1E-08	1E-05		1E-05		--	3E-03	6E+01	6E+01
					Exposure Point Total					1E-05					6E+01
					Exposure Medium Total					1E-05					6E+01
			Medium Total							1E-05					6E+01
			Receptor Total							1E-05					6E+01
							Receptor Risk Total						Receptor HI Total		

Notes
N/A - Not Applicable

Blood HI Across All Media =	4E-02
Kidney HI Across All Media =	1E+01
Liver HI Across All Media =	2E+00
Developmental HI Across All Media =	6E+01
Neurological HI Across All Media =	1E-01
Respiratory HI Across All Media =	3E-05
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01
Skin HI Across All Media =	1E-01
Cardiovascular HI Across All Media =	1E-01
Endocrine HI Across All Media =	2E-01
GI tract HI Across All Media =	2E-03
Reproductive HI Across All Media =	1E-04
Musculoskeletal HI Across All Media =	3E-02

TABLE 9.3.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, SBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Benzene	N/A	1E-12	1E-10		1E-10	Blood	N/A	2E-06	1E-04	1E-04
			Chloroform	N/A	6E-12	6E-11		7E-11	Liver	N/A	1E-06	2E-05	2E-05
			Dibromochloromethane	N/A	2E-12	5E-11		5E-11	Liver	N/A	--	8E-06	8E-06
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	2E-03	2E-03
			Methyl tert-butyl ether	N/A	1E-11	2E-10			Liver; Neurological	N/A	2E-05	3E-04	3E-04
			Tetrachloroethene	N/A	2E-12	9E-09		9E-09	Liver	N/A	1E-06	2E-04	2E-04
			Trichloroethene	N/A	5E-10	2E-08		2E-08	--	N/A	--	--	--
			Dibenzo(a,h)anthracene	N/A	N/A	8E-06		8E-06	--	N/A	N/A	--	--
			Indeno(1,2,3-cd)pyrene	N/A	N/A	2E-08		2E-08	--	N/A	N/A	--	--
			Naphthalene	N/A	9E-13	--		9E-13	Developmental	N/A	9E-06	7E-06	2E-05
			Total PCB Aroclors	N/A	N/A	5E-07		5E-07	Eye; Developmental; Immunological	N/A	N/A	2E+01	2E+01
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	7E-08		7E-08	Immunological	N/A	N/A	2E-02	2E-02
			Arsenic	N/A	N/A	1E-08		1E-08	Skin, Developmental; Cardiovascular; Neurological	N/A	N/A	3E-02	3E-02
			Barium	N/A	N/A	--		--	Kidney; Developmental	N/A	N/A	1E-01	1E-01
			Chromium	N/A	N/A	5E-09		5E-09	Respiratory	N/A	N/A	5E-04	5E-04
			Manganese	N/A	N/A	--		--	--	N/A	N/A	7E-02	7E-02
					Chemical Total	--	6E-10	8E-06		8E-06		--	3E-05
		Exposure Point Total					8E-06					2E+01	
		Exposure Medium Total					8E-06					2E+01	
Medium Total							8E-06					2E+01	
Receptor Total			Receptor Risk Total					8E-06	Receptor HI Total				2E+01

Notes
N/A - Not Applicable

Blood HI Across All Media =	1E-04
Kidney HI Across All Media =	1E-01
Liver HI Across All Media =	5E-04
Developmental HI Across All Media =	2E+01
Neurological HI Across All Media =	3E-02
Respiratory HI Across All Media =	5E-04
Eye HI Across All Media =	2E+01
Immunological HI Across All Media =	2E+01
Skin HI Across All Media =	3E-02
Cardiovascular HI Across All Media =	3E-02

TABLE 9.4.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Benzene	N/A	3E-12	2E-10		2E-10	Blood	N/A	4E-06	3E-04	4E-04
			Bromodichloromethane	N/A	3E-12	3E-11		3E-11	Developmental; Kidney	N/A	4E-06	2E-05	3E-05
			Chloroform	N/A	8E-12	8E-11		9E-11	Liver	N/A	1E-06	2E-05	3E-05
			cis-1,2-Dichloroethene	N/A	--	--		--	Kidney	N/A	--	4E-03	4E-03
			Tetrachloroethene	N/A	5E-13	2E-09		2E-09	Liver	N/A	3E-07	3E-05	3E-05
			Trichloroethene	N/A	1E-10	4E-09		4E-09	--	N/A	--	--	--
			Vinyl chloride	N/A	5E-13	3E-10		3E-10	Liver	N/A	1E-06	2E-04	2E-04
			Benzo(g,h,i)perylene	N/A	N/A	--			--	N/A	N/A	--	--
			bis(2-Ethylhexyl)phthalate	N/A	N/A	1E-09		1E-09	Liver	N/A	N/A	5E-04	5E-04
			Indeno(1,2,3-cd)pyrene	N/A	N/A	3E-08		3E-08	--	N/A	N/A	--	--
			Naphthalene	N/A	8E-13	--		8E-13	Developmental	N/A	8E-06	6E-06	1E-05
			Total PCB Aroclors	N/A	N/A	5E-08		5E-08	Eye; Developmental; Immunological	N/A	N/A	2E+00	2E+00
			beta-BHC	N/A	N/A	3E-09			Liver	N/A	N/A	3E-03	3E-03
			delta-BHC	N/A	N/A	--			--	N/A	N/A	--	--
			4,4'-DDD	N/A	N/A	2E-08		2E-08	--	N/A	N/A	--	--
			4,4'-DDE	N/A	N/A	2E-08		2E-08	--	N/A	N/A	--	--
			4,4'-DDT	N/A	N/A	5E-08		5E-08	Liver	N/A	N/A	3E-01	3E-01
			Heptachlor	N/A	N/A	6E-09		6E-09	--	N/A	N/A	2E-03	2E-03
			Antimony	N/A	N/A	--			Blood	N/A	N/A	8E-03	8E-03
			Arsenic	N/A	N/A	4E-08		4E-08	Skin; Developmental; Cardiovascular; Neurological	N/A	N/A	8E-02	8E-02
			Chromium	N/A	N/A	1E-08		1E-08	Respiratory	N/A	N/A	1E-03	1E-03
			Cobalt	N/A	N/A	--		--	Endocrine; Respiratory	N/A	N/A	1E-05	1E-05
			Manganese	N/A	N/A	--		--	--	N/A	N/A	1E-01	1E-01
			Vanadium	N/A	N/A	--		--	--	N/A	N/A	1E-02	1E-02
			Chemical Total	--	1E-10	2E-07		2E-07		--	2E-05	3E+00	3E+00
		Exposure Point Total						2E-07					3E+00
	Exposure Medium Total							2E-07					3E+00
Medium Total								2E-07					3E+00
Receptor Total								2E-07					3E+00
Receptor Risk Total								2E-07	Receptor HI Total				

Notes
N/A - Not Applicable

Blood HI Across All Media =	8E-03
Kidney HI Across All Media =	5E-03
Liver HI Across All Media =	3E-01
Developmental HI Across All Media =	2E+00
Neurological HI Across All Media =	8E-02
Respiratory HI Across All Media =	1E-03
Eye HI Across All Media =	2E+00
Immunological HI Across All Media =	2E+00
Skin HI Across All Media =	8E-02
Cardiovascular HI Across All Media =	8E-02
Endocrine HI Across All Media =	1E-05

TABLE 9.5.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe: Current/Future
Exposure Unit: Groundwater, Entire Aquifer
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Entire Aquifer	Tap Water	Benzene	7E-08	2E-08	5E-09		9E-08	Blood	2E-03	6E-04	4E-04	3E-03		
			Bromodichloromethane	4E-08	5E-08	N/A		9E-08	Kidney	3E-04	--	N/A	3E-04		
			Chlorobenzene	--	--	--		--	Kidney; Liver	3E-03	2E-03	4E-04	5E-03		
			Chloroform	2E-07	2E-07	N/A		3E-07	Liver	4E-03	7E-04	N/A	4E-03		
			Dibromochloromethane	5E-08	3E-08	N/A		8E-08	Liver	2E-04	--	N/A	2E-04		
			1,2-Dichlorobenzene	--	--	--		--	Developmental	3E-04	3E-04	9E-05	7E-04		
			1,3-Dichlorobenzene	--	--	--		--	--	--	--	--	--		
			1,4-Dichlorobenzene	5E-08	2E-07	1E-08		2E-07	Liver	1E-03	2E-04	3E-04	1E-03		
			1,1-Dichloroethane	7E-09	3E-09	N/A		1E-08	Kidney; Neurological	5E-05	--	N/A	5E-05		
			1,2-Dichloroethane	9E-08	4E-08	N/A		1E-07	Neurological	--	2E-03	N/A	2E-03		
			1,1-Dichloroethene	--	--	--		--	Liver	2E-03	7E-04	9E-05	2E-03		
			cis-1,2-Dichloroethene	--	--	N/A		--	Kidney	1E+02	--	N/A	1E+02		
			trans-1,2-Dichloroethene	--	--	N/A		--	Blood; Liver; Respiratory	4E-02	2E-02	N/A	7E-02		
			Methyl tert-butyl ether	4E-08	1E-08	N/A		5E-08	Kidney; Liver	--	1E-04	N/A	1E-04		
			Methylene chloride	7E-09	7E-10	N/A		7E-09	Liver	1E-04	1E-05	N/A	1E-04		
			Tetrachloroethene	3E-05	7E-07	9E-06		4E-05	Liver; Neurological	5E-02	3E-03	1E-02	7E-02		
			1,2,3-Trichlorobenzene	--	--	--		--	--	--	--	--	--		
			1,2,4-Trichlorobenzene	3E-06	--	2E-06		5E-06	Kidney; Blood	8E-02	7E-01	5E-02	8E-01		
			1,1,2-Trichloroethane	4E-07	2E-07	N/A		6E-07	Blood	1E-02	--	N/A	1E-02		
			Trichloroethene	7E-05	4E-05	5E-06		1E-04	--	--	--	--	--		
			Vinyl chloride	1E-04	1E-06	N/A		1E-04	Liver	2E-01	1E-02	N/A	3E-01		
			bis(2-Ethylhexyl)phthalate	1E-07	N/A	2E-07		3E-07	Liver	4E-03	N/A	5E-03	9E-03		
			Dibenzo(a,h)anthracene	2E-06	N/A	7E-05		7E-05	--	--	N/A	--	--		
			Indeno(1,2,3-cd)pyrene	2E-07	N/A	4E-06		4E-06	--	--	N/A	--	--		
			Naphthalene	--	4E-08	--		4E-08	Developmental	2E-04	3E-03	7E-05	3E-03		
			Total PCB Aroclors	3E-06	N/A	5E-05		6E-05	Eye; Developmental; Immunological	3E+00	N/A	5E+01	5E+01		
			gamma-Chlordane	7E-06	N/A	1E-05		2E-05	Liver	3E-01	N/A	6E-01	9E-01		
			4,4'-DDD	7E-05	N/A	4E-04		5E-04	--	--	N/A	--	--		
			4,4'-DDE	3E-05	N/A	1E-04		2E-04	--	--	N/A	--	--		
			4,4'-DDT	7E-05	N/A	7E-04		8E-04	Liver	3E+00	N/A	3E+01	4E+01		
			Heptachlor	8E-05	N/A	3E-05		1E-04	Liver	3E-01	N/A	1E-01	4E-01		
			2,3,7,8-TCDD Toxic Equivalence	7E-06	N/A	1E-04		1E-04	Developmental	4E-01	N/A	6E+00	7E+00		
			Aluminum	--	N/A	--		--	Neurological	4E-03	N/A	7E-06	4E-03		
			Arsenic	2E-04	N/A	4E-07		2E-04	Skin; Developmental; Cardiovascular; Neurological	3E+00	N/A	7E-03	3E+00		
			Barium	--	N/A	--		--	Kidney; Developmental	4E-02	N/A	1E-03	4E-02		
			Cadmium	--	N/A	--		--	Kidney	2E-02	N/A	6E-04	2E-02		
			Chromium	2E-06	N/A	3E-07		2E-06	Respiratory	1E-02	N/A	2E-03	1E-02		
			Cobalt	--	N/A	--		--	Endocrine; Respiratory	2E-02	N/A	2E-05	2E-02		
			Iron	--	N/A	--		--	GI tract	1E-02	N/A	2E-05	1E-02		
			Manganese	--	N/A	--		--	Neurological	2E-01	N/A	9E-03	2E-01		
			Vanadium	--	N/A	--		--	--	2E-02	N/A	2E-03	2E-02		
						Chemical Total	7E-04	5E-05	2E-03		2E-03		1E+02	8E-01	9E+01
					Exposure Point Total					2E-03					2E+02
				Exposure Medium Total					2E-03					2E+02	
			Medium Total					2E-03					2E+02		
			Receptor Total	Receptor Risk Total				2E-03	Receptor HI Total				2E+02		

Notes
N/A - Not Applicable

Blood HI Across All Media =	9E-01
Kidney HI Across All Media =	1E+02
Liver HI Across All Media =	4E+01
Developmental HI Across All Media =	6E+01
Neurological HI Across All Media =	4E+00
Respiratory HI Across All Media =	1E-01
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01
Skin HI Across All Media =	3E+00
Cardiovascular HI Across All Media =	3E+00
Endocrine HI Across All Media =	2E-02
GI tract HI Across All Media =	1E-02

TABLE 9.6.CT
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	Benzene	1E-07	2E-08	6E-09		1E-07	Blood	6E-03	1E-03	5E-09	7E-03
			Bromodichloromethane	7E-08	6E-08	N/A		1E-07	Kidney	6E-04	--	N/A	6E-04
			Chlorobenzene	--	--	--		--	Kidney; Liver	6E-03	3E-03	8E-04	1E-02
			Chloroform	2E-07	2E-07	N/A		5E-07	Liver	9E-03	1E-03	N/A	1E-02
			Dibromochloromethane	8E-08	3E-08	N/A		1E-07	Liver	5E-04	--	N/A	5E-04
			1,2-Dichlorobenzene	--	--	--		--	Developmental	8E-04	5E-04	2E-04	1E-03
			1,3-Dichlorobenzene	--	--	--		--	--	--	--	--	--
			1,4-Dichlorobenzene	7E-08	2E-07	2E-08		3E-07	Liver	2E-03	3E-04	6E-04	3E-03
			1,1-Dichloroethane	1E-08	4E-09	N/A		2E-08	Kidney; Neurological	1E-04	--	N/A	1E-04
			1,2-Dichloroethane	1E-07	5E-08	N/A		2E-07	Neurological	--	3E-03	N/A	3E-03
			1,1-Dichloroethene	--	--	--		--	Liver	4E-03	1E-03	2E-04	5E-03
			cis-1,2-Dichloroethene	--	--	N/A		--	Kidney	2E+02	--	N/A	2E+02
			trans-1,2-Dichloroethene	--	--	N/A		--	Blood; Liver; Respiratory	1E-01	4E-02	N/A	1E-01
			Methyl tert-butyl ether	6E-08	1E-08	N/A		7E-08	Kidney; Liver	--	2E-04	N/A	2E-04
			Methylene chloride	1E-08	9E-10	N/A		1E-08	Liver	3E-04	2E-05	N/A	3E-04
			Tetrachloroethene	5E-05	8E-07	1E-05		7E-05	Liver; Neurological	1E-01	6E-03	3E-02	1E-01
			1,2,3-Trichlorobenzene	--	--	--		--	--	--	--	--	--
			1,2,4-Trichlorobenzene	5E-06	--	2E-06		7E-06	Kidney; Blood	2E-01	1E+00	9E-02	2E+00
			1,1,2-Trichloroethane	6E-07	2E-07	N/A		8E-07	Blood	3E-02	--	N/A	3E-02
			Trichloroethene	1E-04	5E-05	7E-06		2E-04	--	--	--	--	--
			Vinyl chloride	2E-04	2E-06	N/A		2E-04	Liver	6E-01	2E-02	N/A	6E-01
			bis(2-Ethylhexyl)phthalate	2E-07	N/A	3E-07		5E-07	Liver	9E-03	N/A	1E-02	2E-02
			Dibenzo(a,h)anthracene	1E-05	N/A	2E-04		2E-04	--	--	N/A	--	--
			Indeno(1,2,3-cd)pyrene	1E-06	N/A	1E-05		1E-05	--	--	N/A	--	--
			Naphthalene	--	4E-08	--		4E-08	Developmental	5E-04	5E-03	1E-04	6E-03
			Total PCB Aroclors	5E-06	N/A	7E-05		8E-05	Eye; Developmental; Immunological	7E+00	N/A	1E+02	1E+02
			gamma-Chlordane	1E-05	N/A	2E-05		3E-05	Liver	7E-01	N/A	1E+00	2E+00
			4,4'-DDD	1E-04	N/A	6E-04		7E-04	--	--	N/A	--	--
			4,4'-DDE	4E-05	N/A	2E-04		2E-04	--	--	N/A	--	--
			4,4'-DDT	1E-04	N/A	1E-03		1E-03	Liver	8E+00	N/A	7E+01	7E+01
			Heptachlor	1E-04	N/A	4E-05		2E-04	Liver	6E-01	N/A	2E-01	8E-01
			2,3,7,8-TCDD Toxic Equivalence	1E-05	N/A	2E-04		2E-04	Developmental	8E-01	N/A	1E+01	1E+01
			Aluminum	--	N/A	--		--	Neurological	9E-03	N/A	2E-05	9E-03
			Arsenic	3E-04	N/A	6E-07		3E-04	Skin; Developmental; Cardiovascular; Neurological	8E+00	N/A	2E-02	8E+00
			Barium	--	N/A	--		--	Kidney; Developmental	9E-02	N/A	2E-03	9E-02
			Cadmium	--	N/A	--		--	Kidney	4E-02	N/A	1E-03	4E-02
			Chromium	1E-05	N/A	1E-06		1E-05	Respiratory	2E-02	N/A	4E-03	3E-02
			Cobalt	--	N/A	--		--	Endocrine; Respiratory	4E-02	N/A	4E-05	4E-02
			Iron	--	N/A	--		--	GI tract	2E-02	N/A	5E-05	2E-02
			Manganese	--	N/A	--		--	Neurological	4E-01	N/A	2E-02	4E-01
			Vanadium	--	N/A	--		--	--	5E-02	N/A	4E-03	5E-02
			Chemical Total	1E-03	6E-05	2E-03		3E-03		3E+02	1E+00	2E+02	4E+02
		Exposure Point Total						3E-03					4E+02
	Exposure Medium Total							3E-03					4E+02
Medium Total								3E-03					4E+02
Receptor Total								Receptor Risk Total 3E-03					Receptor HI Total 4E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	2E+00
Kidney HI Across All Media =	2E+02
Liver HI Across All Media =	8E+01
Developmental HI Across All Media =	1E+02
Neurological HI Across All Media =	9E+00
Respiratory HI Across All Media =	2E-01
Eye HI Across All Media =	1E+02
Immunological HI Across All Media =	1E+02
Skin HI Across All Media =	8E+00
Cardiovascular HI Across All Media =	8E+00
Endocrine HI Across All Media =	4E-02
GI tract HI Across All Media =	2E-02

TABLE 10.1.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Process Water	cis-1,2-Dichloroethene						Kidney	N/A	--	1E+01	1E+01
			Tetrachloroethene	N/A	4E-05	6E-05		1E-04	Kidney; Blood	N/A	1E+01	1E-01	1E+01
			1,2,4-Trichlorobenzene										
			Trichloroethene	N/A	2E-03	4E-05		3E-03	Eye; Developmental; Immunological	N/A	N/A	6E+01	6E+01
			Dibenzo(a,h)anthracene	N/A	N/A	2E-04		2E-04					
			Total PCB Aroclors	N/A	N/A	2E-04		2E-04					
			4,4'-DDD	N/A	N/A	1E-03		1E-03	Liver	N/A	N/A	4E+01	4E+01
			4,4'-DDE	N/A	N/A	5E-04		5E-04					
			4,4'-DDT	N/A	N/A	2E-03		2E-03					
			Heptachlor	N/A	N/A	1E-04		1E-04	Developmental	N/A	N/A	7E+00	7E+00
			2,3,7,8-TCDD Toxic Equivalence	N/A	N/A	4E-04		4E-04					
		Chemical Total	--	--	5E-03		7E-03		--	1E+01	1E+02	1E+02	
Exposure Point Total								7E-03					1E+02
Exposure Medium Total								7E-03					1E+02
Medium Total								7E-03					1E+02
Receptor Total			Receptor Risk Total					7E-03	Receptor HI Total				1E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	1E+01
Kidney HI Across All Media =	3E+01
Liver HI Across All Media =	4E+01
Developmental HI Across All Media =	7E+00
Eye HI Across All Media =	6E+01
Immunological HI Across All Media =	6E+01

TABLE 10.2.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	cis-1,2-Dichloroethene						Kidney Eye; Developmental; Immunological Liver	N/A	--	2E+01	2E+01		
			Total PCB Aroclors							N/A	N/A	5E+01	5E+01		
			4,4'-DDT							N/A	N/A	1E+00	1E+00		
			Chemical Total							--	--	7E+01	7E+01		
		Exposure Point Total													7E+01
		Exposure Medium Total													7E+01
Medium Total														7E+01	
Receptor Total				Receptor Risk Total					Receptor HI Total					7E+01	

Notes

N/A - Not Applicable

Kidney HI Across All Media =	2E+01
Liver HI Across All Media =	1E+00
Developmental HI Across All Media =	5E+01
Eye HI Across All Media =	5E+01

TABLE 10.3.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, SBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Total PCB Aroclors						Eye; Developmental; Immunological	N/A	N/A	2E+01	2E+01		
			Chemical Total									2E+01	2E+01		
		Exposure Point Total													2E+01
		Exposure Medium Total													2E+01
		Medium Total													2E+01
Receptor Total				Receptor Risk Total					Receptor HI Total					2E+01	

Notes
N/A - Not Applicable

Developmental HI Across All Media =	2E+01
Eye HI Across All Media =	2E+01
Immunological HI Across All Media =	2E+01

TABLE 10.4.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Total PCB Aroclors						Eye; Developmental; Immunological	N/A	N/A	2E+00	2E+00
			Chemical Total									2E+00	2E+00
		Exposure Point Total											2E+00
		Exposure Medium Total											2E+00
		Medium Total											2E+00
Receptor Total				Receptor Risk Total					Receptor HI Total				2E+00

Notes
N/A - Not Applicable

Developmental HI Across All Media =	2E+00
Eye HI Across All Media =	2E+00
Immunological HI Across All Media =	2E+00

TABLE 10.5.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene						Kidney	2E+02	--	N/A	2E+02
			Tetrachloroethene	3E-04	2E-05	1E-04		4E-04	Kidney; Blood	2E-01	4E+00	1E-01	4E+00
			1,2,4-Trichlorobenzene										
			Trichloroethene	6E-04	1E-03	6E-05		2E-03					
			Vinyl chloride	1E-03	4E-05	N/A		1E-03					
			Dibenzo(a,h)anthracene	3E-05	N/A	3E-04		3E-04	Eye; Developmental; Immunological	6E+00	N/A	8E+01	8E+01
			Total PCB Aroclors	3E-05	N/A	3E-04		4E-04					
			gamma-Chlordane	6E-05	N/A	8E-05		1E-04					
			4,4'-DDD	6E-04	N/A	3E-03		3E-03					
			4,4'-DDE	2E-04	N/A	9E-04		1E-03	Liver	7E+00	N/A	5E+01	6E+01
			4,4'-DDT	6E-04	N/A	5E-03		5E-03					
			Heptachlor	6E-04	N/A	2E-04		8E-04					
			2,3,7,8-TCDD Toxic Equivalence	6E-05	N/A	8E-04		9E-04					
			Arsenic	2E-03	N/A	4E-06		2E-03	Developmental Skin; Developmental; Cardiovascular; Neurological	7E-01	N/A	1E+01	1E+01
		Chemical Total	6E-03	1E-03	1E-02		2E-02						
Exposure Point Total									2E-02				
Exposure Medium Total									2E-02				
Medium Total									2E-02				
Receptor Total				Receptor Risk Total					2E-02	Receptor HI Total			

Notes
N/A - Not Applicable

Blood HI Across All Media =	4E+00
Kidney HI Across All Media =	2E+02
Liver HI Across All Media =	6E+01
Developmental HI Across All Media =	1E+02
Neurological HI Across All Media =	7E+00
Eye HI Across All Media =	8E+01
Immunological HI Across All Media =	8E+01
Skin HI Across All Media =	7E+00

TABLE 10.6.RME
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene						Kidney	5E+02	--	N/A	5E+02
			Tetrachloroethene	1E-04	7E-06	4E-05		2E-04	Kidney; Blood	4E-01	1E+01	3E-01	1E+01
			1,2,4-Trichlorobenzene										
			Trichloroethene	2E-04	5E-04	2E-05		7E-04	Liver	1E+00	2E-01	N/A	1E+00
			Vinyl chloride	4E-04	2E-05	N/A		5E-04					
			Dibenzo(a,h)anthracene	2E-05	N/A	3E-04		4E-04	Eye; Developmental; Immunological	1E+01	N/A	2E+02	2E+02
			Total PCB Aroclors	1E-05	N/A	1E-04		1E-04	Liver	1E+00	N/A	2E+00	3E+00
			gamma-Chlordane										
			4,4'-DDD	2E-04	N/A	1E-03		1E-03					
			4,4'-DDE	9E-05	N/A	3E-04		4E-04					
			4,4'-DDT	2E-04	N/A	2E-03		2E-03	Liver	2E+01	N/A	1E+02	1E+02
			Heptachlor	2E-04	N/A	7E-05		3E-04	Liver	1E+00	N/A	4E-01	2E+00
			2,3,7,8-TCDD Toxic Equivalence	2E-05	N/A	3E-04		3E-04	Developmental	2E+00	N/A	2E+01	2E+01
			Arsenic	6E-04	N/A	2E-06		6E-04	Skin; Developmental; Cardiovascular; Neurological	2E+01	N/A	5E-02	2E+01
		Chemical Total	2E-03	5E-04	4E-03		7E-03		5E+02	1E+01	3E+02	8E+02	
Exposure Point Total								7E-03					8E+02
Exposure Medium Total								7E-03					8E+02
Medium Total								7E-03					8E+02
Receptor Total			Receptor Risk Total					7E-03	Receptor HI Total				8E+02

Notes
N/A - Not Applicable

Blood HI Across All Media =	1E+01
Kidney HI Across All Media =	5E+02
Liver HI Across All Media =	1E+02
Developmental HI Across All Media =	2E+02
Eye HI Across All Media =	2E+02
Immunological HI Across All Media =	2E+02
Skin HI Across All Media =	2E+01
Cardiovascular HI Across All Media =	2E+01

TABLE 10.1.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Commercial/Industrial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient								
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total				
Groundwater	Entire Aquifer	Process Water	cis-1,2-Dichloroethene	N/A	4E-04	5E-06		4E-04	Kidney	N/A	--	6E+00	6E+00				
			1,2,4-Trichlorobenzene						Kidney; Blood	N/A	8E+00	5E-02	8E+00				
			Trichloroethene						Eye; Developmental; Immunological	N/A	N/A	5E+01	5E+01				
			Total PCB Aroclors														
			4,4'-DDD											N/A	N/A	3E-04	3E-04
			4,4'-DDE											N/A	N/A	1E-04	1E-04
		4,4'-DDT	N/A	N/A	5E-04	5E-04	Liver Developmental	N/A	N/A	3E+01	3E+01						
			N/A	N/A	6E+00	6E+00											
	Chemical Total	--	4E-04	9E-04		1E-03	--	8E+00	9E+01	1E+02							
	Exposure Point Total					1E-03				1E+02							
	Exposure Medium Total					1E-03				1E+02							
Medium Total						1E-03				1E+02							
Receptor Total				Receptor Risk Total				1E-03	Receptor HI Total			1E+02					

Notes
N/A - Not Applicable

Blood HI Across All Media =	8E+00
Kidney HI Across All Media =	1E+01
Liver HI Across All Media =	3E+01
Developmental HI Across All Media =	6E+00
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01

TABLE 10.2.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Onsite Groundwater
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Onsite Groundwater	Top of the Groundwater Table	cis-1,2-Dichloroethene						Kidney Eye; Developmental; Immunological Liver	N/A	–	1E+01	1E+01		
			Total PCB Aroclors							N/A	N/A	5E+01	5E+01		
			4,4'-DDT							N/A	N/A	1E+00	1E+00		
			Chemical Total							--	--	6E+01	6E+01		
		Exposure Point Total													6E+01
		Exposure Medium Total													6E+01
Medium Total														6E+01	
Receptor Total				Receptor Risk Total					Receptor HI Total					6E+01	

Notes

N/A - Not Applicable

Kidney HI Across All Media =	1E+01
Liver HI Across All Media =	1E+00
Developmental HI Across All Media =	5E+01
Eye HI Across All Media =	5E+01

TABLE 10.3.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, SBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient						
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total		
Groundwater	Shallow Offsite Groundwater, South of Bound Brook (SBB)	Top of the Groundwater Table	Total PCB Aroclors						Eye; Developmental; Immunological	N/A	N/A	2E+01	2E+01		
			Chemical Total											--	--
		Exposure Point Total													2E+01
		Exposure Medium Total													2E+01
		Medium Total													2E+01
Receptor Total				Receptor Risk Total					Receptor HI Total					2E+01	

Notes
N/A - Not Applicable

Developmental HI Across All Media =	2E+01
Eye HI Across All Media =	2E+01
Immunological HI Across All Media =	2E+01

TABLE 10.4.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Shallow Offsite Groundwater, NBB
Receptor Population:	Construction/Utility Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total	
Groundwater	Shallow Offsite Groundwater, North of Bound Brook (NBB)	Top of the Groundwater Table	Total PCB Aroclors						Eye; Developmental; Immunological	N/A	N/A	2E+00	2E+00	
			Chemical Total							--	--	2E+00	2E+00	
		Exposure Point Total												
		Exposure Medium Total												
		Medium Total												
Receptor Total				Receptor Risk Total					Receptor HI Total					

Notes
N/A - Not Applicable

Developmental HI Across All Media =	2E+00
Eye HI Across All Media =	2E+00
Immunological HI Across All Media =	2E+00

TABLE 10.5.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene						Kidney	1E+02	--	N/A	1E+02
			Trichloroethene	7E-05	4E-05	5E-06		1E-04	Eye; Developmental; Immunological	3E+00	N/A	5E+01	5E+01
			Vinyl chloride	1E-04	1E-06	N/A		1E-04					
			4,4'-DDD	7E-05	N/A	4E-04		5E-04					
			4,4'-DDE	3E-05	N/A	1E-04		2E-04	Liver	3E+00	N/A	3E+01	4E+01
			4,4'-DDT	7E-05	N/A	7E-04		8E-04					
			Heptachlor	8E-05	N/A	3E-05		1E-04					
			2,3,7,8-TCDD Toxic Equivalence	7E-06	N/A	1E-04		1E-04	Developmental Skin; Developmental; Cardiovascular; Neurological	4E-01	N/A	6E+00	7E+00
			Arsenic	2E-04	N/A	4E-07		2E-04					
		Chemical Total	7E-04	5E-05	1E-03		2E-03		1E+02	--	9E+01	2E+02	
Exposure Point Total								2E-03					2E+02
Exposure Medium Total								2E-03					2E+02
Medium Total								2E-03					2E+02
Receptor Total			Receptor Risk Total					2E-03	Receptor HI Total				2E+02

Notes
N/A - Not Applicable

Kidney HI Across All Media =	1E+02
Liver HI Across All Media =	4E+01
Developmental HI Across All Media =	6E+01
Neurological HI Across All Media =	3E+00
Eye HI Across All Media =	5E+01
Immunological HI Across All Media =	5E+01
Skin HI Across All Media =	3E+00
Cardiovascular HI Across All Media =	3E+00

TABLE 10.6.CT
RISK SUMMARY
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Exposure Unit:	Groundwater, Entire Aquifer
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	External (Radiation)	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Entire Aquifer	Tap Water	cis-1,2-Dichloroethene						Kidney	2E+02	--	N/A	2E+02
			1,2,4-Trichlorobenzene						Kidney; Blood	2E-01	1E+00	9E-02	2E+00
			Trichloroethene	1E-04	5E-05	7E-06		2E-04					
			Vinyl chloride	2E-04	2E-06	N/A		2E-04					
			Dibenzo(a,h)anthracene	1E-05	N/A	2E-04		2E-04					
			Total PCB Aroclors						Eye; Developmental; Immunological	7E+00	N/A	1E+02	1E+02
			gamma-Chlordane						Liver	7E-01	N/A	1E+00	2E+00
			4,4'-DDD	1E-04	N/A	6E-04		7E-04					
			4,4'-DDE	4E-05	N/A	2E-04		2E-04					
			4,4'-DDT	1E-04	N/A	1E-03		1E-03	Liver	8E+00	N/A	7E+01	7E+01
			Heptachlor	1E-04	N/A	4E-05		2E-04					
			2,3,7,8-TCDD Toxic Equivalence	1E-05	N/A	2E-04		2E-04	Developmental	8E-01	N/A	1E+01	1E+01
			Arsenic	3E-04	N/A	6E-07		3E-04	Skin; Developmental; Cardiovascular; Neurological	8E+00	N/A	2E-02	8E+00

Notes
N/A - Not Applicable

Blood HI Across All Media =	2E+00
Kidney HI Across All Media =	2E+02
Liver HI Across All Media =	8E+01
Developmental HI Across All Media =	1E+02
Neurological HI Across All Media =	8E+00
Eye HI Across All Media =	1E+02
Immunological HI Across All Media =	1E+02
Skin HI Across All Media =	8E+00
Cardiovascular HI Across All Media =	8E+00

APPENDIX B

Historical Groundwater Data Summaries

Appendix B, Table B-1
Summary of Foster Wheeler Groundwater Samples
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Site, South Plainfield, NJ

Shallow Bedrock Groundwater Samples ¹		
Sample ID	Screened Interval (feet bgs)	Sample Date
MW01A	24-49	10/11/2000
MW02A	24-49	10/12/2000
MW03	17-32	10/12/2000
MW04	29-49	10/13/2000
MW05	25-45.5	10/17/2000
MW06	29-44	10/17/2000
MW07	43-58	10/11/2000
MW08	42-57.5	10/10/2000
MW09	29-54	10/18/2000
MW10	37-52	10/10/2000
MW11	34-59	10/18/2000
MW12	35-60	10/20/2000
FPW 3	"shallow"	10/13/2000
FPW 3	"deep"	10/20/2000

Test Pit Seep Water and Perched Water ²		
Sample ID	Depth of Wet Zone ³ (feet bgs)	Sample Date
TP03	8-9.5	6/8/2000
TP06	3-6	6/12/2000
TP08	NA	6/9/2000
TP09	5-7	6/9/2000
TP09 DUP		6/9/2000
TP10	6-10	6/12/2000
MW02	7	8/3/2000
MW04	6-13	8/15/2000
MW06	4.5-10	8/8/2000
MW11	2-6	8/22/2000
MW12	4.5-8	9/5/2000

Notes

¹ Foster Wheeler (2001a) Data Evaluation Report, Appendix B Tables B-29 to B-34a.

² Foster Wheeler (2001a) Data Evaluation Report, Appendix B Tables B-23 to B-26 (test pit seeps) and Tables B-27 to B-28 (perched groundwater).

³ Foster Wheeler (2002) Final Remedial Investigation Report, p. 3-7.

NA - Not Available

Appendix B, Table B-2
Foster Wheeler Shallow Bedrock Monitoring Well Data
Baseline Human Health Risk Assessment
Cornell Dubiller Electronics Inc. Site, South Plainfield, NJ

Chemical	Frequency of Detection	Range of Detected Concentrations (µg/L)	Screening Toxicity Value ¹ (µg/L) Basis	Chemical of Potential Concern? [Y/N]	Rationale for Selection or Exclusion ²
Volatile Organic Compounds					
Acetone	1 / 2	4 J	2,200 nc	N	2
cis-1,2-Dichloroethene	12 / 14	2 - 175,000	7.3 nc	Y	1
Tetrachloroethene	3 / 14	12 J - 520	0.11 ca	Y	1
Toluene	1 / 14	1	230 nc	N	2
1,2,4-Trichlorobenzene	2 / 14	9 J - 1,200	0.41 nc	Y	1
Trichloroethene	12 / 14	12 - 110,000	2.0 ca	Y	1
Vinyl chloride	5 / 14	1 - 160	0.016 ca	Y	1
Semi-Volatile Organic Compounds					
bis(2-Ethylhexyl)phthalate	1 / 14	1 J	4.8 ca	N	2
Naphthalene	1 / 14	4.5 J	0.14 ca	Y	1
Pesticides					
Aldrin	10 / 13	0.022 - 1.3 D	0.004 ca	Y	1
beta-BHC	1 / 14	0.016 J	0.037 ca	N	2
delta-BHC	1 / 12	0.074 JN	NA ca	Y	5
Heptachlor	1 / 13	0.13 JN	0.015 ca	Y	1
PCB Aroclors					
Aroclor 1232	9 / 14	0.53 - 80 D	0.0068 ca	Y	1
Aroclor 1254	3 / 14	4.1 - 8.5 J	0.034 ca	Y	1
PCB Congeners and Dioxins/Furans					
2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	5 / 5	2.4E-06 - 2.1E+00	5.2E-07 ca	Y	1
Inorganic Chemicals					
Aluminum	14 / 14	37.3 B - 747	3,700 nc	N	2
Antimony	1 / 14	3 B	1.5 nc	Y	1
Arsenic	2 / 14	3.4 B - 5.6 B	0.045 ca	Y	1
Barium	14 / 14	79.4 B - 1,590	730 nc	Y	1
Beryllium	10 / 14	0.21 B - 0.33 B	7.3 nc	N	2
Calcium	14 / 14	19,500 - 126,000	NA	N	3
Chromium	12 / 12	3.8 B - 18	0.043 ^a ca	Y	1
Cobalt	7 / 14	0.66 B - 2.7 B	1.1 nc	Y	1
Copper	14 / 14	2.1 B - 36.9	150 nc	N	2
Cyanide	8 / 10	0.72 B - 5.6 B	73 ^b nc	N	2
Iron	14 / 14	76.7 B - 1,210	2,600 nc	N	2
Magnesium	14 / 14	7,800 - 29,000	NA	N	3
Manganese	14 / 14	36.4 - 2,570	88 nc	Y	1
Nickel	14 / 14	3.2 B - 42 J	73 ^d nc	N	2
Potassium	14 / 14	1,080 B - 7,490 J	NA	N	3
Selenium	1 / 14	4.5 BJ	18 nc	N	2
Sodium	14 / 14	13,100 J - 43,800 J	NA	N	3
Vanadium	13 / 14	1.3 B - 8.5 B	18 nc	N	2
Zinc	10 / 14	1.5 B - 44.6	1,100 nc	N	2

Notes

¹ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is for mercuric chloride and other mercury salts.

d = Screening toxicity value is for nickel soluble salts.

² Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5% (does not apply where sample size is less than 20)

5 = No screening toxicity value available

³ 2,3,7,8-TCDD TEQ represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

NA = Not Available

Appendix B, Table B-3
Foster Wheeler Test Pit Seep and Perched Groundwater Data
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Site, South Plainfield, NJ

Chemical	Frequency of Detection	Range of Detected Concentrations (µg/L)	Screening Toxicity Value ¹ (µg/L)	Basis	Chemical of Potential Concern? [Y/N]	Rationale for Selection or Exclusion ²
<i>Volatile Organic Compounds</i>						
Acetone	3 / 4	10 J - 14 J	2,200	nc	N	2
Benzene	2 / 10	0.4 J - 0.6 J	0.41	ca	Y	1
Chlorobenzene	4 / 10	3 - 255	9.1	nc	Y	1
1,2-Dichlorobenzene	3 / 10	10 - 42.5	37	nc	Y	1
1,3-Dichlorobenzene	3 / 10	16 - 34	NA		Y	5
1,4-Dichlorobenzene	3 / 10	29 J - 150	0.43	ca	Y	1
1,1-Dichloroethene	2 / 10	0.6 J - 4	34	nc	N	2
cis-1,2-Dichloroethene	8 / 10	3 - 3,900 D	7.3	nc	Y	1
trans-1,2-Dichloroethene	2 / 10	38 J - 140 J	11	nc	Y	1
Ethylbenzene	3 / 10	1 - 19	1.5	ca	Y	1
Methylene chloride	2 / 10	21 J - 140 J	4.8	ca	Y	1
1,1,2,2-Tetrachloroethane	1 / 10	0.4 J	0.067	ca	Y	1
Tetrachloroethene	3 / 10	0.7 J - 67.3	0.11	ca	Y	1
Toluene	2 / 10	0.7 J - 1	230	nc	N	2
1,2,4-Trichlorobenzene	4 / 10	36 - 450 J	0.41	nc	Y	1
1,1,2-Trichloroethane	1 / 10	2	0.24	ca	Y	1
Trichloroethene	8 / 10	8 - 15,000 D	2.0	ca	Y	1
Vinyl chloride	5 / 10	6 - 380	0.016	ca	Y	1
Xylene (total)	3 / 10	4 - 94	120	nc	N	2
<i>Semi-Volatile Organic Compounds</i>						
Acenaphthene	2 / 5	1 J - 4 J	220	nc	N	2
Acenaphthylene	1 / 5	5 J	NA		Y	5
Anthracene	1 / 5	11 J	1,100	nc	N	2
Benzo(a)anthracene	2 / 5	7 - 35 J	0.029	ca	Y	1
Benzo(a)pyrene	2 / 5	5 - 29 J	0.0029	ca	Y	1
Benzo(b)fluoranthene	2 / 5	1 J - 35 J	0.029	ca	Y	1
Benzo(g,h,i)perylene	2 / 5	4 J - 13 J	NA		Y	5
Benzo(k)fluoranthene	1 / 5	12 J	0.29	ca	Y	1
2-Chloronaphthalene	2 / 5	11 J	290	nc	N	2
2-Chlorophenol	1 / 5	3.5 J	18	nc	N	2
Chrysene	2 / 5	4 J - 9	2.9	ca	Y	1
o-Cresol	2 / 5	1 J - 3 J	180	nc	N	2
p-Cresol	2 / 5	4 J - 5.5	18	nc	N	2
Dibenzo(a,h)anthracene	1 / 5	4 J	0.0029	ca	Y	1
Dibenzofuran	1 / 5	5 J	3.7	nc	Y	1
2,4-Dichlorophenol	1 / 5	3.5 J	11	nc	N	2
2,4-Dimethylphenol	2 / 5	1 J - 5	73	nc	N	2
bis(2-Ethylhexyl)phthalate	1 / 4	2 J	4.8	ca	N	2
Fluoranthene	2 / 5	1 J - 18 J	150	nc	N	2
Fluorene	2 / 5	6 - 8 J	150	nc	N	2
Indeno(1,2,3-cd)pyrene	2 / 5	1 J - 16 J	0.029	ca	Y	1
2-Methylnaphthalene	1 / 5	2 J	15	nc	N	2
Naphthalene	3 / 5	2 J - 9 J	0.14	ca	Y	1
Phenanthrene	1 / 5	30 J	NA		Y	5
Phenol	1 / 5	14.5	1,100	nc	N	2
Pyrene	3 / 5	1 J - 20	110	nc	N	2
<i>Pesticides</i>						
Aldrin	4 / 4	5.3 J - 41.5 J	0.004	ca	Y	1
alpha-BHC	1 / 3	4.1 J	0.011	ca	Y	1
gamma-Chlordane	5 / 5	0.02 J - 32 J	0.19	ca	Y	1
Dieldrin	1 / 4	20 J	0.0042	ca	Y	1
4,4'-DDE	4 / 4	6.6 J - 25 J	0.20	ca	Y	1
4,4'-DDT	1 / 5	0.04 J	0.20	ca	N	2
Endrin	1 / 3	0.2 J	1.1	nc	Y	1
Endrin ketone	4 / 5	0.05 J - 5.4 J	NA		Y	5
Heptachlor	3 / 4	0.021 J - 14 J	0.015	ca	Y	1
Methoxychlor	2 / 3	1.9 J - 4.6 J	18	nc	N	2

Appendix B, Table B-3
Foster Wheeler Test Pit Seep and Perched Groundwater Data
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Site, South Plainfield, NJ

Chemical	Frequency of Detection	Range of Detected Concentrations (µg/L)	Screening Toxicity Value ¹ (µg/L)	Basis	Chemical of Potential Concern? [Y/N]	Rationale for Selection or Exclusion ²
PCB Aroclors						
Aroclor 1242	5 / 10	0.65 J - 1,450 D	0.034	ca	Y	1
Aroclor 1248	2 / 9	550 D - 2,300 D	0.034	ca	Y	1
Aroclor 1254	8 / 10	1.7 J - 5,100 D	0.034	ca	Y	1
PCB Congeners						
2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	2 / 2	7E-02 - 2E+00	5.2E-07	ca	Y	1
Inorganic Chemicals						
Aluminum	5 / 5	4,530 - 238,000	3,700	nc	Y	1
Antimony	2 / 5	2.7 B - 4.2 B	1.5	nc	Y	1
Arsenic	4 / 5	7.4 B - 334	0.045	ca	Y	1
Barium	5 / 5	158 B - 4,320	730	nc	Y	1
Beryllium	5 / 5	0.3 B - 15.2 J	7.3	nc	Y	1
Cadmium	4 / 5	0.78 - 1,890	1.8	nc	Y	1
Calcium	5 / 5	46,500 - 97,250	NA		N	3
Chromium	5 / 5	10.4 - 1,110	0.043 ^a	ca	Y	1
Cobalt	5 / 5	3.8 B - 161	1.1	nc	Y	1
Copper	5 / 5	26.4 J - 9,060 J	150	nc	Y	1
Cyanide	2 / 5	0.61 B - 2.6 B	73 ^b	nc	N	2
Iron	5 / 5	7420 - 301,000	2,600	nc	Y	1
Lead	5 / 5	52.4 - 11,900	15 ^c	al	Y	1
Magnesium	5 / 5	10,000 - 66,300	NA		N	3
Manganese	5 / 5	313 - 5,210	88	nc	Y	1
Mercury	4 / 5	0.08 B - 4	1.1 ^d	nc	Y	1
Nickel	5 / 5	14 B - 557	73 ^e	nc	Y	1
Potassium	5 / 5	4,210 B - 15,200	NA		N	3
Selenium	2 / 5	2.7 B - 8.8 J	18	nc	N	2
Silver	5 / 5	1.1 B - 22.6	18	nc	Y	1
Sodium	5 / 5	6,500 J - 14,600 J	NA		N	3
Vanadium	5 / 5	7.7 B - 1,330	18	nc	Y	1
Zinc	5 / 5	68.4 - 15,000	1,100	nc	Y	1

Notes

¹ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 201aa), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is the drinking water action level (al) of 15 µg/L

d = Screening toxicity value is for mercuric chloride and other mercury salts.

e = Screening toxicity value is for nickel soluble salts.

² Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5% (does not apply where sample size is less than 20)

5 = No screening toxicity value available

³ 2,3,7,8-TCDD TEQ represents PCB congeners TEQ.

NA = Not Available

Appendix B, Table B-4
USEPA 2008 Groundwater Data
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Site, South Plainfield, NJ

Chemical	USEPA 2008 Data Summary		Screening Toxicity		Chemical of Potential Concern?	Rationale for Selection or Exclusion ²
	Frequency of Detection	Range of Detected Concentrations (µg/L)	Value ¹	Basis		
Volatile Organic Compounds						
Acetone	2 / 50	1.3 J - 12 J	2,200	nc	N	2
Benzene	7 / 50	0.16 J - 15 J	0.41	ca	Y	1
Bromodichloromethane	1 / 50	0.645	0.12	ca	Y	1
2-Butanone	6 / 50	1.35 - 33	710	nc	N	2
Carbon tetrachloride	17 / 50	0.12 J - 270	0.44	ca	Y	1
Chlorobenzene	5 / 50	1 J - 110	9.1	nc	Y	1
Chloroethane	1 / 50	9.7 J	2,100	nc	N	2
Chloroform	8 / 50	0.53 - 3.85	0.19	ca	Y	1
Chloromethane	2 / 50	0.52 - 0.6	19	nc	N	2
Cyclohexane	5 / 50	3.7 J - 50 J	1,300	nc	N	2
Dibromochloromethane	1 / 50	0.1025 J	0.15	ca	N	2
1,2-Dichlorobenzene	7 / 50	0.091 - 62	37	nc	Y	1
1,3-Dichlorobenzene	5 / 50	1 - 81	NA		Y	5
1,4-Dichlorobenzene	9 / 50	0.1 - 115	0.43	ca	Y	1
1,1-Dichloroethane	2 / 50	0.16 - 0.17	2.4	ca	N	2
1,1-Dichloroethene	3 / 50	1.1 - 26	34	nc	N	2
cis-1,2-Dichloroethene	43 / 50	0.0635 J - 310,000	7.3	nc	Y	1
trans-1,2-Dichloroethene	18 / 50	0.11 J - 1,500	11	nc	Y	1
2-Hexanone	5 / 50	34 - 340	4.7	nc	Y	1
Isopropylbenzene	2 / 50	0.095 J - 3.55 J	68	nc	N	2
Methylcyclohexane	2 / 50	15 J - 15.5	NA		Y	5
Methyl tert-butyl ether	27 / 50	0.068 J - 520	12	ca	Y	1
Tetrachloroethene	30 / 50	0.079 J - 1,100	0.11	ca	Y	1
Toluene	4 / 50	0.99 - 7.15	230	nc	N	2
1,2,3-Trichlorobenzene	10 / 50	0.073 - 470	2.9	nc	Y	1
1,2,4-Trichlorobenzene	9 / 50	0.083 - 1,500	0.41	nc	Y	1
1,1,1-Trichloroethane	6 / 50	0.051 - 0.595	910	nc	N	2
1,1,2-Trichloroethane	8 / 50	0.42 - 130	0.24	ca	Y	1
1,1,2-Trichloro-1,2,2-trifluoroethane	1 / 50	1.6	5,900	nc	N	2
Trichloroethene	47 / 50	0.28 J - 160,000	2.0	ca	Y	1
Vinyl chloride	14 / 50	0.05 J - 890	0.016	ca	Y	1
Semi-Volatile Organic Compounds						
Benzo(a)anthracene	1 / 50	2.76 J	0.029	ca	Y	1
Benzo(a)pyrene	1 / 50	0.96 J	0.0029	ca	Y	1
Benzo(b)fluoranthene	1 / 50	1.45 J	0.029	ca	Y	1
Benzo(k)fluoranthene	1 / 50	2.705 J	0.29	ca	Y	1
1,1'-Biphenyl	2 / 50	2.8 - 3.45	180	nc	N	2
Caprolactam	13 / 50	0.96 J - 48.5	1,800	nc	N	2
Carbazole	1 / 50	0.67 J	NA		Y	5
Chrysene	1 / 50	2.8 J	2.9	ca	N	2
cis-1,3-Dichloropropene	6 / 50	0.255 J - 64 J	0.43	ca	Y	1
trans-1,3-Dichloropropene	5 / 50	4.3 J - 48 J	0.43	ca	Y	1
bis(2-Ethylhexyl)phthalate	7 / 50	0.54 J - 2.6 J	4.8	ca	N	2
Fluoranthene	1 / 50	1.125 J	150	ca	N	2
4-Methyl-2-pentanone	5 / 50	2.9 - 26	2,000	nc	N	2
Naphthalene	1 / 50	7.3	0.14	ca	Y	1
Phenol	1 / 50	1.635 J	1,100	nc	N	2
Pyrene	2 / 50	0.51 J - 1.025 J	110	nc	N	2
Pesticides						
Aldrin	2 / 49	0.0066 J - 0.36	0.004		Y	1
beta-BHC	2 / 48	0.16 JN - 1.55 J	0.037	ca	Y	1
delta-BHC	5 / 49	0.0055 J - 0.091	NA		Y	5
gamma-BHC (Lindane)	3 / 50	0.0082 J - 0.49 JN	0.061		Y	1
alpha-Chlordane	1 / 49	0.074	NA		Y	5
gamma-Chlordane	6 / 49	0.0072 J - 5.2	0.19	ca	Y	1
4,4'-DDE	4 / 50	0.0071 - 4.1	0.20	ca	Y	1
4,4'-DDT	8 / 50	0.092 - 14	0.20	ca	Y	1
Dieldrin	7 / 50	0.016 J - 0.91 J	0.0042	ca	Y	1
Endosulfan I	1 / 49	0.0098 J	NA		Y	5
Endosulfan II	1 / 49	0.0277 J	NA		Y	5
Endosulfan sulfate	2 / 50	0.0057 J - 0.028 J	NA		Y	5
Endrin	1 / 49	0.64 J	1.1	nc	N	2
Endrin aldehyde	4 / 50	0.014 J - 0.066 J	NA		Y	5
Endrin ketone	3 / 50	0.0055 J - 0.032 J	NA		Y	5
Heptachlor	3 / 47	0.0084 J - 0.3	0.015	ca	Y	1
Heptachlor epoxide	8 / 49	0.0051 J - 6.4	0.0074	ca	Y	1

Appendix B, Table B-4
USEPA 2008 Groundwater Data
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Site, South Plainfield, NJ

Chemical	USEPA 2008 Data Summary		Screening Toxicity		Chemical of Potential Concern?	Rationale for Selection or Exclusion ²
	Frequency of Detection	Range of Detected Concentrations (µg/L)	Value ¹	(µg/L) Basis		
[Y/N]						
PCB Aroclors						
Aroclor-1242	6 / 50	1.1 JN - 165 J	0.034	ca	Y	1
Aroclor-1254	6 / 50	1.8 - 61 J	0.034	ca	Y	1
Inorganic Chemicals						
Arsenic	49 / 49	1.1 - 144.2	0.045	ca	Y	1
Barium	49 / 49	30.9 - 6,950	730	nc	Y	1
Cadmium	1 / 49	1.2 J	1.8	nc	N	2
Chromium	12 / 49	2.2 - 1,180	0.043 ^a	ca	Y	1
Cobalt	7 / 49	1.1 - 16.7 J	1.1	nc	Y	1
Copper	22 / 47	0.34 J - 63.4 J	150	nc	N	2
Lead	43 / 49	1.1 - 6.35	15 ^b	al	N	2
Manganese	42 / 49	0.8 - 1,300	88	nc	Y	1
Nickel	47 / 49	1.1 - 43.2	73 ^c	nc	N	2
Silver	7 / 49	0.06 J - 1.1	18	nc	N	2
Vanadium	37 / 49	4.15 - 41.2	18	nc	Y	1
Zinc	45 / 45	5.1 - 62.7	1,100	nc	N	2

Notes

¹ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

c = Screening toxicity value is for nickel soluble salts.

² Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5% (does not apply where sample size is less than 20)

5 = No screening toxicity value available

NA = Not Available

ND = Not Detected

APPENDIX C

Evaluation of Groundwater Data from Onsite Monitoring Wells Only

APPENDIX C

Onsite Groundwater Data Summary

Groundwater data from only the onsite monitoring wells, across all depths, was not quantitatively evaluated as a separate “entire aquifer” exposure unit in this BHHRA. While chemicals were detected at relatively greater concentrations in the onsite vs. offsite monitoring wells, and there is the potential for future potable use of groundwater within the former CDE facility boundaries (however unlikely), it was assumed detected concentrations are elevated enough that the potential for human health risks is evident without quantifying exposure and risk. To illustrate, the groundwater data from all onsite wells, across all depths, were summarized and presented herein.

APPENDIX C, TABLE C-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER, ONSITE MONITORING WELLS ONLY
CORNELL DUBILIER ELECTRONICS INC. SITE
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Detection Frequency	Concentration Used for Screening	Screening Toxicity Value ¹	Basis	Potential ARAR/TBC Value ²	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
Within the Boundaries of the Former CDE Facility	67-64-1	Acetone	0.82 J	78	µg/L	22 / 91	78	2,200	nc	NA	--	N	2
	71-43-2	Benzene	0.16 J	24	µg/L	22 / 93	24	0.41	ca	1	NJDEP MCL	Y	1
	75-27-4	Bromodichloromethane	0.28 J	0.55	µg/L	4 / 92	0.55	0.12	ca	80	Federal MCL	N	1,4
	75-25-2	Bromoform	0.58	2.9	µg/L	5 / 92	2.9	8.5	ca	80	Federal MCL	N	2
	78-93-3	2-Butanone	5.5	39	µg/L	3 / 89	39	710	nc	NA	--	N	2,4
	56-23-5	Carbon tetrachloride	0.25 J	0.72 J	µg/L	2 / 93	0.72	0.44	ca	2	NJDEP MCL	N	1,4
	108-90-7	Chlorobenzene	0.21 J	65 E	µg/L	31 / 93	65	9.1	nc	50	NJDEP MCL	Y	1
	67-66-3	Chloroform	0.33 J	150 J	µg/L	27 / 93	150	0.19	ca	80	Federal MCL	Y	1
	74-87-3	Chloromethane	0.62 J	1.3	µg/L	2 / 93	1.3	19	nc	NA	--	N	2,4
	110-82-7	Cyclohexane	0.23 J	13	µg/L	11 / 93	13	1,300	nc	NA	--	N	2
	96-12-8	1,2-Dibromo-3-chloropropane	0.039 J	0.39 J	µg/L	7 / 93	0.39	0.00032	ca	0.2	Federal MCL	Y	1
	124-48-1	Dibromochloromethane	0.28 J	1.2	µg/L	4 / 93	1.2	0.15	ca	80	Federal MCL	N	1,4
	106-93-4	1,2-Dibromoethane	0.01 J	0.01 J	µg/L	1 / 93	0.01	0.0065	ca	0.05	Federal MCL	N	1,4
	95-50-1	1,2-Dichlorobenzene	0.15 J	56	µg/L	25 / 92	56	37	nc	600	Federal MCL	Y	1
	541-73-1	1,3-Dichlorobenzene	0.17 J	120	µg/L	31 / 92	120	NA		600	NJDEP MCL	Y	5
	106-46-7	1,4-Dichlorobenzene	0.25 J	110	µg/L	32 / 92	110	0.43	ca	75	Federal MCL	Y	1
	75-34-3	1,1-Dichloroethane	0.11 J	26 E	µg/L	31 / 93	26	2.4	ca	50	NJDEP MCL	Y	1
	107-06-2	1,2-Dichloroethane	0.22 J	15	µg/L	12 / 93	15	0.15	ca	2	NJDEP MCL	Y	1
	75-35-4	1,1-Dichloroethene	0.73	280 J	µg/L	40 / 93	280	34	nc	2	NJDEP MCL	Y	1
	156-59-2	cis-1,2-Dichloroethene	0.25 J	390,000 J	µg/L	89 / 93	390,000	7.3	nc	70	Federal MCL	Y	1
	156-60-5	trans-1,2-Dichloroethene	0.11 J	1300 J	µg/L	55 / 93	1,300	11	nc	100	Federal MCL	Y	1
	100-41-4	Ethylbenzene	0.43 J	20	µg/L	5 / 93	20	1.5	ca	700	Federal MCL	Y	1
	98-82-8	Isopropylbenzene	0.2 J	5.1 J	µg/L	3 / 93	5.1	68	nc	NA	--	N	2,4
	79-20-9	Methyl acetate	3.4 J	3.4 J	µg/L	1 / 93	3.4	3,700	nc	NA	--	N	2,4
	1634-04-4	Methyl tert-butyl ether	0.15 J	74 E	µg/L	44 / 93	74	12	ca	70	NJDEP MCL	Y	1
	108-87-2	Methylcyclohexane	0.14 J	42	µg/L	11 / 92	42	NA		NA	--	Y	5
	75-09-2	Methylene chloride	0.36 J	7 J	µg/L	10 / 93	7.0	4.8	ca	3	NJDEP MCL	Y	1
	127-18-4	Tetrachloroethene	0.16 J	1,600 E	µg/L	52 / 93	1,600	0.11	ca	1	NJDEP MCL	Y	1
	108-88-3	Toluene	0.13 J	78 J	µg/L	52 / 93	78	230	nc	1,000	Federal MCL	N	2
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.2	2.2	µg/L	3 / 93	2.2	5,900	nc	NA	--	N	2,4
	87-61-6	1,2,3-Trichlorobenzene	0.12 J	280	µg/L	35 / 92	280	2.9	nc	NA	--	Y	1
	120-82-1	1,2,4-Trichlorobenzene	0.1 J	1,600 J	µg/L	44 / 92	1,600	0.41	nc	9	NJDEP MCL	Y	1
	71-55-6	1,1,1-Trichloroethane	0.32 J	0.73 J	µg/L	3 / 93	0.7	910	nc	30	NJDEP MCL	N	2,4
	79-00-5	1,1,2-Trichloroethane	0.46 J	120	µg/L	19 / 93	120	0.24	ca	3	NJDEP MCL	Y	1
	79-01-6	Trichloroethene	0.52 J	170,000 E	µg/L	89 / 93	170,000	2.0	ca	1	NJDEP MCL	Y	1
	1330-20-7	m,p-Xylene	0.41 J	15	µg/L	5 / 93	15	20	nc	1,000	NJDEP MCL	N	2
	1330-20-7	o-Xylene	0.33 J	85	µg/L	8 / 93	85	20	nc	1,000	NJDEP MCL	Y	1
	75-01-4	Vinyl chloride	0.5 J	860 J	µg/L	51 / 93	860	0.016	ca	2	Federal MCL	Y	1

APPENDIX C, TABLE C-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER, ONSITE MONITORING WELLS ONLY
CORNELL DUBILIER ELECTRONICS INC. SITE
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Detection Frequency	Concentration Used for Screening	Screening Toxicity Value ¹	Basis	Potential ARAR/TBC Value ²	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
	83-32-9	Acenaphthene	0.26	0.39	µg/L	4 / 94	0.39	220	nc	NA	--	N	2,4
	98-86-2	Acetophenone	1.6 J	2.8 J	µg/L	2 / 94	2.8	370	nc	NA	--	N	2,4
	120-12-7	Anthracene	0.49 J	0.49 J	µg/L	1 / 94	0.49	1,100	nc	NA	--	N	2,4
	100-52-7	Benzaldehyde	4.2 J	7.2	µg/L	2 / 93	7.2	370	nc	NA	--	N	2,4
	56-55-3	Benzo(a)anthracene	0.18	1.7 E	µg/L	2 / 94	1.7	0.029	ca	NA	--	N	1,4
	50-32-8	Benzo(a)pyrene	0.14	4.3 J	µg/L	5 / 94	4.3	0.0029	ca	0.2	Federal MCL	Y	1
	205-99-2	Benzo(b)fluoranthene	0.096 J	3 J	µg/L	5 / 94	3	0.029	ca	NA	--	Y	1
	191-24-2	Benzo(g,h,i)perylene	0.17	2.6 J	µg/L	6 / 94	2.6	NA	ca	NA	--	Y	5
	207-08-9	Benzo(k)fluoranthene	0.091 J	3.5 J	µg/L	5 / 94	3.5	0.29	ca	NA	--	Y	1
	92-52-4	1,1'-Biphenyl	1.1 J	17	µg/L	4 / 94	17	0.083	nc	NA	--	N	1,4
	117-81-7	bis(2-Ethylhexyl)phthalate	2.1 J	12	µg/L	13 / 94	12	4.8	ca	6	Federal MCL	Y	1
	105-60-2	Caprolactam	2.3 J	84 E	µg/L	15 / 94	84	1,800	nc	NA	--	N	2
	86-74-8	Carbazole	0.54 J	0.54 J	µg/L	1 / 94	0.54	NA	nc	NA	--	N	4,5
	95-57-8	2-Chlorophenol	2.6 J	2.6 J	µg/L	1 / 93	2.6	18	nc	NA	--	N	2,4
	218-01-9	Chrysene	0.11	1.7 E	µg/L	3 / 94	1.7	2.9	ca	NA	--	N	2,4
	53-70-3	Dibenzo(a,h)anthracene	0.096 J	5.5 E	µg/L	14 / 94	5.5	0.0029	ca	NA	--	Y	1
	120-83-2	2,4-Dichlorophenol	5.3	5.3	µg/L	1 / 94	5.3	11	nc	NA	--	N	2,4
	84-66-2	Diethylphthalate	1.7 J	41	µg/L	2 / 94	41	2,900	nc	NA	--	N	2,4
	131-11-3	Dimethylphthalate	11	11	µg/L	1 / 94	11	NA	nc	NA	--	N	4,5
	206-44-0	Fluoranthene	0.38	2.9 E	µg/L	2 / 94	2.9	150	nc	NA	--	N	2,4
	86-73-7	Fluorene	0.29	0.56	µg/L	2 / 94	0.56	150	nc	NA	--	N	2,4
	193-39-5	Indeno(1,2,3-cd)pyrene	0.08	3.1 J	µg/L	30 / 94	3.1	0.029	ca	NA	--	Y	1
	91-57-6	2-Methylnaphthalene	0.12	2.2 E	µg/L	6 / 94	2.2	15	nc	NA	--	N	2
	91-20-3	Naphthalene	0.08 J	14 J	µg/L	46 / 94	14	0.14	ca	300	NJDEP MCL	Y	1
	87-86-5	Pentachlorophenol	0.076 J	0.076 J	µg/L	1 / 62	0.08	0.17	ca	1	Federal MCL	N	2,4
	85-01-8	Phenanthrene	0.13	1.5 E	µg/L	2 / 94	1.5	NA	ca	NA	--	N	4,5
	108-95-2	Phenol	1.8 J	4.3 J	µg/L	3 / 93	4.3	1,100	nc	NA	--	N	2,4
	129-00-0	Pyrene	0.33	2.3 E	µg/L	3 / 94	2.3	110	nc	NA	--	N	2,4
	95-94-3	1,2,4,5-Tetrachlorobenzene	3.5 J	3.5 J	µg/L	1 / 94	3.5	1.1	nc	NA	--	N	1,4
	12674-11-2	Aroclor 1016	0.064 J	30 E	µg/L	15 / 94	30	0.26	nc	0.5	Federal MCL	Y	1
	12672-29-6	Aroclor 1248	0.12 J	7,300 J	µg/L	14 / 88	7,300	0.034	ca	0.5	Federal MCL	Y	1
	11097-69-1	Aroclor 1254	0.043 J	5,600 J	µg/L	46 / 94	5,600	0.034	ca	0.5	Federal MCL	Y	1
	319-84-6	alpha-BHC	0.09 JN	68	µg/L	13 / 94	68	0.011	ca	NA	--	Y	1
	319-85-7	beta-BHC	0.18 J	680 EP	µg/L	4 / 94	680	0.037	ca	NA	--	N	1,4
	319-86-8	delta-BHC	0.34 J	880 J	µg/L	3 / 71	880	NA	ca	NA	--	N	4,5
	72-54-8	4,4'-DDD	0.09 J	1,800 NJ	µg/L	9 / 81	1,800	0.28	ca	NA	--	Y	1
	72-55-9	4,4'-DDE	0.09 J	1,600 J	µg/L	14 / 91	1,600	0.20	ca	NA	--	Y	1
	50-29-3	4,4'-DDT	0.13	4,000 J	µg/L	18 / 90	4,000	0.20	ca	NA	--	Y	1
	60-57-1	Dieldrin	0.18 JN	350 JN	µg/L	6 / 90	350	0.0042	ca	NA	--	Y	1
	33213-65-9	Endosulfan II	0.17 J	240 J	µg/L	7 / 94	240	NA		NA	--	Y	5
	1031-07-8	Endosulfan sulfate	0.078 J	75 JN	µg/L	7 / 94	75	NA		NA	--	Y	5
	72-20-8	Endrin	0.19 JN	0.19 JN	µg/L	1 / 90	0.19	1.1	nc	2	Federal MCL	N	2,4
	7421-93-4	Endrin aldehyde	0.11 J	150 J	µg/L	6 / 94	150	NA		NA	--	Y	5
	76-44-8	Heptachlor	0.06 J	300	µg/L	14 / 94	300	0.015	ca	0.4	Federal MCL	Y	1
	1024-57-3	Heptachlor epoxide	2.6 NJ	2.6 NJ	µg/L	1 / 94	2.6	0.0074	ca	0.2	Federal MCL	N	1,4
	72-43-5	Methoxychlor	0.97 JN	400 JN	µg/L	4 / 94	400	18	nc	40	Federal MCL	N	1,4
	--	2,3,7,8-TCDD Toxic Equivalence (TEQ) ³	8.1E-10 J	2.2E-01	µg/L	24 / 25	2.2E-01	5.2E-07	ca	3E-05	Federal MCL	Y	1

APPENDIX C, TABLE C-1
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN (COPC) IN GROUNDWATER - ENTIRE AQUIFER, ONSITE MONITORING WELLS ONLY
CORNELL DUBILIER ELECTRONICS INC. SITE
SOUTH PLAINFIELD, NEW JERSEY

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Entire Aquifer

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Detection Frequency	Concentration Used for Screening	Screening Toxicity Value ¹	Basis	Potential ARAR/TBC Value ²	Potential ARAR/TBC Source	COPC Flag [Y/N]	Rationale for Selection or Deletion
	7429-90-5	Aluminum	26.6 J	6,210	µg/L	36 / 93	6,210	3,700	nc	NA	--	Y	1
	7440-36-0	Antimony	2.0	3.5	µg/L	3 / 94	3.5	1.5	nc	6	Federal MCL	N	1,4
	7440-38-2	Arsenic	0.68 J	829	µg/L	94 / 94	829	0.045	ca	5	NJDEP MCL	Y	1
	7440-39-3	Barium	52	2,650	µg/L	94 / 94	2,650	730	nc	2,000	Federal MCL	Y	1
	7440-41-7	Beryllium	0.2 J	0.23 J	µg/L	2 / 94	0.23	7.3	nc	4	Federal MCL	N	2,4
	7440-43-9	Cadmium	0.037 J	17	µg/L	10 / 94	17	1.8	nc	5	Federal MCL	Y	1
	7440-70-2	Calcium	40,100	142,000	µg/L	94 / 94	142,000	NA	nc	NA	--	N	3,5
	18540-29-9	Chromium	0.11 J	97	µg/L	41 / 94	97	0.043 ^a	ca	100	Federal MCL	Y	1
	7440-48-4	Cobalt	0.075 J	3.5	µg/L	32 / 94	3.5	1.1	nc	NA	--	Y	1
	7440-50-8	Copper	0.53 J	80	µg/L	75 / 94	80	150	nc	1,300	Federal MCL	N	2
	57-12-5	Cyanide	1.1 J	11.6 J	µg/L	7 / 94	12	73 ^b	nc	200	Federal MCL	N	2
	7439-89-6	Iron	46.6 J	8,520	µg/L	44 / 94	8,520	2,600	nc	NA	--	Y	1
	7739-92-1	Lead	0.25 J	33	µg/L	81 / 94	33	15 ^c	al	15	Federal MCL	Y	1
	7439-95-4	Magnesium	6,960	30,300	µg/L	94 / 94	30,300	NA	nc	NA	--	N	3,5
	7439-96-5	Manganese	3.9	1,660	µg/L	94 / 94	1,660	88	nc	NA	--	Y	1
	7487-94-7	Mercury	0.048 J	0.11 J	µg/L	5 / 47	0.11	1.1 ^d	nc	2	Federal MCL	N	2
	7440-02-0	Nickel	0.25 J	18	µg/L	74 / 78	18	73 ^e	nc	NA	--	N	2
	7440-9-7	Potassium	1,390 J	9,450	µg/L	53 / 94	9,450	NA	nc	NA	--	N	3,5
	7782-49-2	Selenium	0.16 J	0.37 J	µg/L	17 / 94	0.37	18	nc	50	Federal MCL	N	2
	7440-22-4	Silver	0.016 J	0.12 J	µg/L	8 / 94	0.12	18	nc	NA	--	N	2
	7440-23-5	Sodium	10,900	59,800	µg/L	94 / 94	59,800	NA	nc	50,000	NJDEP MCL	N	3,5
	7440-62-2	Vanadium	1.3 J	30	µg/L	66 / 94	30	18	nc	NA	--	Y	1
	7440-66-6	Zinc	2.5	187	µg/L	94 / 94	187	1,100	nc	NA	--	N	2

Notes

¹ The relevant screening toxicity values are the USEPA Regional Screening Levels (RSL) for tapwater from May 2011 (USEPA, 2011a), which are based on either a cancer (ca) risk of one in a million (i.e., 10⁻⁶ cancer risk level) or a non-cancer (nc) hazard quotient (HQ) of 1. Consistent with USEPA, Region 2 guidance, RSLs based on non-cancer effects were reduced by a factor of 10 to represent a target HQ of 0.1. Where a cancer risk-based RSL was greater than the resultant non-cancer 0.1 HQ-based RSL, the applicable screening toxicity value is the non-cancer based level.

a = Screening toxicity value is for Chromium VI.

b = Screening toxicity value is for free cyanide (CN⁻).

c = Screening toxicity value is the drinking water action level (al) of 15 µg/L.

d = Screening toxicity value is for mercuric chloride and other mercury salts.

e = Screening toxicity value is for nickel soluble salts.

² The potential ARAR/TBC value is the lower of the Safe Drinking Water Act Maximum Contaminant Levels (MCL) (40 CFR 141) and the New Jersey Drinking Water Quality Act MCL (NJAC 7:10-16).

³ 2,3,7,8-TCDD Toxic Equivalence (TEQ) represents the sum of dioxin/furan TEQ and PCB congeners TEQ.

NA = Not Available

Rationale Codes:

1 = Maximum concentration exceeds screening toxicity value

2 = Maximum concentration does not exceed screening toxicity value

3 = Chemical is an essential nutrient

4 = Frequency of detection is less than 5%

5 = No screening toxicity value available

APPENDIX D

ProUCL version 4.1.00 Output Files for Groundwater COPCs

D1 - 95% UCL Calculations

D2 - Box Plots

Benzene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	31
Number of Distinct Detected Data	27	Number of Non-Detect Data	230
		Percent Non-Detects	88.12%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.135	Minimum Detected	-2.002
Maximum Detected	24	Maximum Detected	3.178
Mean of Detected	1.791	Mean of Detected	-0.578
SD of Detected	4.893	SD of Detected	1.152
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.806
Shapiro Wilk Test Statistic	0.35	5% Shapiro Wilk Critical Value	0.929
5% Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.316	Mean	-0.74
SD	28.96	SD	1.408
95% DL/2 (t) UCL	8.275	95% H-Stat (DL/2) UCL	1.599

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.209
		SD in Log Scale	0.75
		Mean in Original Scale	0.504
		SD in Original Scale	1.738
		95% t UCL	0.681
		95% Percentile Bootstrap UCL	0.689
		95% BCA Bootstrap UCL	0.837
		95% H-UCL	0.433

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.51	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.511		
nu star	31.62		

A-D Test Statistic	4.953	Nonparametric Statistics	
5% A-D Critical Value	0.806	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.806	Mean	0.486
5% K-S Critical Value	0.166	SD	1.77
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.116
		95% KM (t) UCL	0.677
		95% KM (z) UCL	0.676
		95% KM (jackknife) UCL	0.674
		95% KM (bootstrap t) UCL	1.294
	1.00E-06	95% KM (BCA) UCL	0.722
	24	95% KM (Percentile Bootstrap) UCL	0.682
	0.868	95% KM (Chebyshev) UCL	0.991
	0.319	97.5% KM (Chebyshev) UCL	1.209
	1.906	99% KM (Chebyshev) UCL	1.638
	0.147		
	5.893		
	76.88	Potential UCLs to Use	
	57.68	95% KM (BCA) UCL	0.722
	1.157		
	1.159		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Bromodichloromethane

General Statistics - Data are in µg/L.

Number of Valid Data	260	Number of Detected Data	23
Number of Distinct Detected Data	20	Number of Non-Detect Data	237
		Percent Non-Detects	91.15%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.14	Minimum Detected	-1.966
Maximum Detected	1.7	Maximum Detected	0.531
Mean of Detected	0.539	Mean of Detected	-0.808
SD of Detected	0.389	SD of Detected	0.607
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	260
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.766
Shapiro Wilk Test Statistic	0.766	5% Shapiro Wilk Critical Value	0.914
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.226	Mean	-0.758
SD	28.98	SD	1.388
95% DL/2 (t) UCL	8.193	95% H-Stat (DL/2) UCL	1.52

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.122
		SD in Log Scale	0.419
		Mean in Original Scale	0.357
		SD in Original Scale	0.175
		95% t UCL	0.375
		95% Percentile Bootstrap UCL	0.375
		95% BCA Bootstrap UCL	0.377
		95% H-UCL	0.372

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	2.46	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	0.219		
nu star	113.1		

A-D Test Statistic	0.73	Nonparametric Statistics	
5% A-D Critical Value	0.751	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.751	Mean	0.36
5% K-S Critical Value	0.183	SD	0.17
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.0279
		95% KM (t) UCL	0.406
		95% KM (z) UCL	0.406
		95% KM (jackknife) UCL	0.408
		95% KM (bootstrap t) UCL	0.41
	1.00E-06	95% KM (BCA) UCL	0.404
	0.434	95% KM (Percentile Bootstrap) UCL	0.404
	0.466	95% KM (Chebyshev) UCL	0.481
	0.245	97.5% KM (Chebyshev) UCL	0.534
	0.668	99% KM (Chebyshev) UCL	0.637
	0.649		
	347.4	Potential UCLs to Use	
	305.2	95% KM (t) UCL	0.406
	0.494		
	0.494		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Chlorobenzene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	31
Number of Distinct Detected Data	28	Number of Non-Detect Data	230
		Percent Non-Detects	88.12%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.21	Minimum Detected	-1.561
Maximum Detected	65	Maximum Detected	4.174
Mean of Detected	10.97	Mean of Detected	0.762
SD of Detected	18.36	SD of Detected	1.947
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.638
Shapiro Wilk Test Statistic	0.638	5% Shapiro Wilk Critical Value	0.929
5% Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.316	Mean	-0.63
SD	29.6	SD	1.558
95% DL/2 (t) UCL	9.341	95% H-Stat (DL/2) UCL	2.315

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.796
		SD in Log Scale	1.4
		Mean in Original Scale	1.87
		SD in Original Scale	7.107
		95% t UCL	2.596
		95% Percentile Bootstrap UCL	2.684
		95% BCA Bootstrap UCL	2.884
		95% H-UCL	1.491

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.385	Data do not follow a Discernable Distribution (0.05)	
Theta Star	28.48		
nu star	23.88		

A-D Test Statistic	2.342	Nonparametric Statistics	
5% A-D Critical Value	0.831	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.831	Mean	1.68
5% K-S Critical Value	0.169	SD	7.205
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.46

Assuming Gamma Distribution		95% KM (t) UCL	2.44
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	2.437
Minimum	1.00E-06	95% KM (jackknife) UCL	2.429
Maximum	65	95% KM (bootstrap t) UCL	2.776
Mean	3.533	95% KM (BCA) UCL	2.463
Median	1.00E-06	95% KM (Percentile Bootstrap) UCL	2.419
SD	7.833	95% KM (Chebyshev) UCL	3.687
k star	0.103	97.5% KM (Chebyshev) UCL	4.555
Theta star	34.27	99% KM (Chebyshev) UCL	6.261
Nu star	53.81	Potential UCLs to Use	
AppChi2	37.96	95% KM (Chebyshev) UCL	3.687
95% Gamma Approximate UCL	5.009		
95% Adjusted Gamma UCL	5.019		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Chloroform

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	97
Number of Distinct Detected Data	62	Number of Non-Detect Data	164
		Percent Non-Detects	62.84%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.24	Minimum Detected	-1.427
Maximum Detected	150	Maximum Detected	5.011
Mean of Detected	3.25	Mean of Detected	0.123
SD of Detected	15.26	SD of Detected	1.009
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.107
Lilliefors Test Statistic	0.422	5% Lilliefors Critical Value	0.09
5% Lilliefors Critical Value	0.09	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.035	Mean	-0.328
SD	30.12	SD	1.453
95% DL/2 (t) UCL	9.113	95% H-Stat (DL/2) UCL	2.602

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.646
		SD in Log Scale	1.025
		Mean in Original Scale	1.47
		SD in Original Scale	9.377
		95% t UCL	2.428
		95% Percentile Bootstrap UCL	2.596
		95% BCA Bootstrap UCL	3.682
		95% H-UCL	1.016

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.576	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.641		
nu star	111.8		

A-D Test Statistic	11.2	Nonparametric Statistics	
5% A-D Critical Value	0.81	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.81	Mean	1.522
5% K-S Critical Value	0.0955	SD	9.452
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.594
		95% KM (t) UCL	2.503
		95% KM (z) UCL	2.499
		95% KM (jackknife) UCL	2.5
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	6.553
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	2.777
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	2.681
Maximum	150	95% KM (Chebyshev) UCL	4.112
Mean	1.422	97.5% KM (Chebyshev) UCL	5.234
Median	0.0979	99% KM (Chebyshev) UCL	7.436
SD	9.408		
k star	0.114		
Theta star	12.47		
Nu star	59.51	Potential UCLs to Use	
AppChi2	42.77	95% KM (BCA) UCL	2.777
95% Gamma Approximate UCL	1.979		
95% Adjusted Gamma UCL	1.982		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Dibromochloromethane

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	18
Number of Distinct Detected Data	15	Number of Non-Detect Data	243
		Percent Non-Detects	93.10%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.21	Minimum Detected	-1.561
Maximum Detected	1.2	Maximum Detected	0.182
Mean of Detected	0.407	Mean of Detected	-1.003
SD of Detected	0.231	SD of Detected	0.434
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.716
Shapiro Wilk Test Statistic	0.716	5% Shapiro Wilk Critical Value	0.897
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.192	Mean	-0.785
SD	28.93	SD	1.383
95% DL/2 (t) UCL	8.148	95% H-Stat (DL/2) UCL	1.467

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.197
		SD in Log Scale	0.293
		Mean in Original Scale	0.316
		SD in Original Scale	0.103
		95% t UCL	0.326
		95% Percentile Bootstrap UCL	0.326
		95% BCA Bootstrap UCL	0.328
		95% H-UCL	0.325

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	4.193	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	0.097		
nu star	150.9		

A-D Test Statistic	0.761	Nonparametric Statistics	
5% A-D Critical Value	0.743	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.743	Mean	0.312
5% K-S Critical Value	0.204	SD	0.0943
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.0187
		95% KM (t) UCL	0.343
		95% KM (z) UCL	0.343
		95% KM (jackknife) UCL	0.344
	1.00E-06	95% KM (bootstrap t) UCL	0.351
	1.2	95% KM (BCA) UCL	0.344
	0.355	95% KM (Percentile Bootstrap) UCL	0.343
	0.385	95% KM (Chebyshev) UCL	0.393
	0.15	97.5% KM (Chebyshev) UCL	0.429
	1.313	99% KM (Chebyshev) UCL	0.498
	0.271		
	685.5	Potential UCLs to Use	
	625.8	95% KM (t) UCL	0.343
	0.389		
	0.389		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,2-Dichlorobenzene

General Statistics - Data are in µg/L.

Number of Valid Data	258	Number of Detected Data	25
Number of Distinct Detected Data	23	Number of Non-Detect Data	233
		Percent Non-Detects	90.31%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.15	Minimum Detected	-1.897
Maximum Detected	56	Maximum Detected	4.025
Mean of Detected	6.82	Mean of Detected	0.51
SD of Detected	12.63	SD of Detected	1.741
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	258
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.588
Shapiro Wilk Test Statistic	0.588	5% Shapiro Wilk Critical Value	0.918
5% Shapiro Wilk Critical Value	0.918	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.778	Mean	-0.671
SD	29.32	SD	1.494
95% DL/2 (t) UCL	8.791	95% H-Stat (DL/2) UCL	1.985

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.574
		SD in Log Scale	1.456
		Mean in Original Scale	0.94
		SD in Original Scale	4.326
		95% t UCL	1.384
		95% Percentile Bootstrap UCL	1.418
		95% BCA Bootstrap UCL	1.579
		95% H-UCL	0.753

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.429	Data appear Lognormal at 5% Significance Level	
Theta Star	15.91		
nu star	21.44		

A-D Test Statistic	1.352	Nonparametric Statistics	
5% A-D Critical Value	0.817	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.817	Mean	0.906
5% K-S Critical Value	0.186	SD	4.387
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.285

Assuming Gamma Distribution		95% KM (t) UCL	1.376
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	1.374
Minimum	1.00E-06	95% KM (jackknife) UCL	1.368
Maximum	56	95% KM (bootstrap t) UCL	1.903
Mean	1.733	95% KM (BCA) UCL	1.479
Median	1.00E-06	95% KM (Percentile Bootstrap) UCL	1.427
SD	4.65	95% KM (Chebyshev) UCL	2.146
k star	0.0994	97.5% KM (Chebyshev) UCL	2.683
Theta star	17.44	99% KM (Chebyshev) UCL	3.737
Nu star	51.27	Potential UCLs to Use	
AppChi2	35.82	95% KM (Chebyshev) UCL	2.146
95% Gamma Approximate UCL	2.48		
95% Adjusted Gamma UCL	2.485		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,3-Dichlorobenzene

General Statistics - Data are in µg/L.

Number of Valid Data	258	Number of Detected Data	32
Number of Distinct Detected Data	30	Number of Non-Detect Data	226
		Percent Non-Detects	87.60%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.015	Minimum Detected	-4.2
Maximum Detected	120	Maximum Detected	4.787
Mean of Detected	10.81	Mean of Detected	0.544
SD of Detected	23.67	SD of Detected	2.105
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	258
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Test Statistic	0.51	5% Shapiro Wilk Critical Value	0.93
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.312	Mean	-0.657
SD	30.21	SD	1.556
95% DL/2 (t) UCL	9.418	95% H-Stat (DL/2) UCL	2.245

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.33
		SD in Log Scale	1.648
		Mean in Original Scale	1.723
		SD in Original Scale	8.921
		95% t UCL	2.64
		95% Percentile Bootstrap UCL	2.706
		95% BCA Bootstrap UCL	3.203
		95% H-UCL	1.362

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.351	Data appear Lognormal at 5% Significance Level	
Theta Star	30.82		
nu star	22.44		

A-D Test Statistic	1.468	Nonparametric Statistics	
5% A-D Critical Value	0.841	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.841	Mean	1.613
5% K-S Critical Value	0.167	SD	9.015
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.578
		95% KM (t) UCL	2.566
		95% KM (z) UCL	2.563
		95% KM (jackknife) UCL	2.554
		95% KM (bootstrap t) UCL	3.773
		95% KM (BCA) UCL	2.703
		95% KM (Percentile Bootstrap) UCL	2.611
		95% KM (Chebyshev) UCL	4.131
		97.5% KM (Chebyshev) UCL	5.22
		99% KM (Chebyshev) UCL	7.361
		32.81	
		50.4	Potential UCLs to Use
		35.1	97.5% KM (Chebyshev) UCL
		4.602	
		4.611	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

ENTIRE AQUIFER

1,4-Dichlorobenzene

General Statistics - Data are in µg/L

Number of Valid Data	258	Number of Detected Data	34
Number of Distinct Detected Data	28	Number of Non-Detect Data	224
		Percent Non-Detects	86.82%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.25	Minimum Detected	-1.386
Maximum Detected	110	Maximum Detected	4.7
Mean of Detected	14.46	Mean of Detected	1.132
SD of Detected	23.39	SD of Detected	1.914
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
For all methods (except KM, DL/2, and ROS Methods),
Observations < Largest ND are treated as NDs

Number treated as Non-Detect	258
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics	
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.659 Shapiro Wilk Test Statistic 0.875
5% Shapiro Wilk Critical Value	0.933 5% Shapiro Wilk Critical Value 0.933
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean		6.876 Mean	-0.565
SD		30.35 SD	1.609
95% DL/2 (t) UCL		9.995 95% H-Stat (DL/2) UCL	2.716

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.317
		SD in Log Scale	1.768
		Mean in Original Scale	2.253
		SD in Original Scale	9.651
		95% t UCL	3.245
		95% Percentile Bootstrap UCL	3.304
		95% BCA Bootstrap UCL	3.751
		95% H-UCL	1.752

Gamma Distribution Test with Detected Values Only	Data Distribution Test with Detected Values Only
k star (bias corrected)	0.406 Data do not follow a Discernable Distribution (0.05)
Theta Star	35.64
nu star	27.6

A-D Test Statistic	2.347	Nonparametric Statistics	
5% A-D Critical Value	0.829	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.829	Mean	2.279
5% K-S Critical Value	0.161	SD	9.754
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.625

Assuming Gamma Distribution		95% KM (z) UCL	3.308
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	3.299
Minimum	1.00E-06	95% KM (bootstrap t) UCL	3.878
Maximum	110	95% KM (BCA) UCL	3.289
Mean	3.155	95% KM (Percentile Bootstrap) UCL	3.286
Median	1.00E-06	95% KM (Chebyshev) UCL	5.005
SD	9.942	97.5% KM (Chebyshev) UCL	6.185
k star	0.085	99% KM (Chebyshev) UCL	8.502
Theta star	37.13		
Nu star	43.84	Potential UCLs to Use	
AppChi2	29.66	95% KM (Chebyshev) UCL	5.005
95% Gamma Approximate UCL	4.663		
95% Adjusted Gamma UCL	4.674		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

1,1-Dichloroethane

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	67
Number of Distinct Detected Data	50	Number of Non-Detect Data	194
		Percent Non-Detects	74.33%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.105	Minimum Detected	-2.254
Maximum Detected	25.5	Maximum Detected	3.239
Mean of Detected	1.142	Mean of Detected	-0.632
SD of Detected	3.301	SD of Detected	0.974
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.415
Lilliefors Test Statistic	0.415	5% Lilliefors Critical Value	0.108
5% Lilliefors Critical Value	0.108	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.409	Mean	-0.62
SD	28.94	SD	1.431
95% DL/2 (t) UCL	8.367	95% H-Stat (DL/2) UCL	1.873

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.217
		SD in Log Scale	0.814
		Mean in Original Scale	0.509
		SD in Original Scale	1.71
		95% t UCL	0.684
		95% Percentile Bootstrap UCL	0.703
		95% BCA Bootstrap UCL	0.83
		95% H-UCL	0.456

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.753	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.516		
nu star	101		

A-D Test Statistic	5.562	Nonparametric Statistics	
5% A-D Critical Value	0.791	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.791	Mean	0.512
5% K-S Critical Value	0.113	SD	1.748
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.113

Assuming Gamma Distribution		95% KM (t) UCL	0.699
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	0.698
Minimum	1.00E-06	95% KM (jackknife) UCL	0.698
Maximum	25.5	95% KM (bootstrap t) UCL	1.212
Mean	0.635	95% KM (BCA) UCL	0.732
Median	0.375	95% KM (Percentile Bootstrap) UCL	0.721
SD	1.748	95% KM (Chebyshev) UCL	1.004
k star	0.183	97.5% KM (Chebyshev) UCL	1.217
Theta star	3.481	99% KM (Chebyshev) UCL	1.636
Nu star	95.28	Potential UCLs to Use	
AppChi2	73.77	95% KM (t) UCL	0.699
95% Gamma Approximate UCL	0.821	95% KM (% Bootstrap) UCL	0.721
95% Adjusted Gamma UCL	0.822		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,2-Dichloroethane

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	27
Number of Distinct Detected Data	23	Number of Non-Detect Data	234
		Percent Non-Detects	89.66%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.22	Minimum Detected	-1.514
Maximum Detected	15	Maximum Detected	2.708
Mean of Detected	1.241	Mean of Detected	-0.668
SD of Detected	3.08	SD of Detected	0.968
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.342
Shapiro Wilk Test Statistic	0.342	5% Shapiro Wilk Critical Value	0.923
5% Shapiro Wilk Critical Value	0.923	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.235	Mean	-0.764
SD	28.94	SD	1.388
95% DL/2 (t) UCL	8.191	95% H-Stat (DL/2) UCL	1.511

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.124
		SD in Log Scale	0.578
		Mean in Original Scale	0.438
		SD in Original Scale	1.023
		95% t UCL	0.543
		95% Percentile Bootstrap UCL	0.553
		95% BCA Bootstrap UCL	0.634
		95% H-UCL	0.41

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.634	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.957		
nu star	34.25		

A-D Test Statistic	5.26	Nonparametric Statistics	
5% A-D Critical Value	0.79	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.79	Mean	0.435
5% K-S Critical Value	0.176	SD	1.046
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0724
		95% KM (t) UCL	0.555
		95% KM (z) UCL	0.554
		95% KM (jackknife) UCL	0.554
	1.00E-06	95% KM (bootstrap t) UCL	0.727
	15	95% KM (BCA) UCL	0.571
	0.702	95% KM (Percentile Bootstrap) UCL	0.568
	0.465	95% KM (Chebyshev) UCL	0.751
	1.176	97.5% KM (Chebyshev) UCL	0.887
	0.192	99% KM (Chebyshev) UCL	1.155
	3.66		
	100.1	Potential UCLs to Use	
	77.99	95% KM (t) UCL	0.555
	0.9	95% KM (% Bootstrap) UCL	0.568
	0.901		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,1-Dichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	92
Number of Distinct Detected Data	59	Number of Non-Detect Data	169
		Percent Non-Detects	64.75%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.22	Minimum Detected	-1.514
Maximum Detected	280	Maximum Detected	5.635
Mean of Detected	8.479	Mean of Detected	0.937
SD of Detected	31.79	SD of Detected	1.182
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.117
Lilliefors Test Statistic	0.405	5% Lilliefors Critical Value	0.0924
5% Lilliefors Critical Value	0.0924	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	8.002	Mean	-0.04
SD	34.33	SD	1.641
95% DL/2 (t) UCL	11.51	95% H-Stat (DL/2) UCL	4.873

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.639
		SD in Log Scale	1.639
		Mean in Original Scale	3.237
		SD in Original Scale	19.2
		95% t UCL	5.199
		95% Percentile Bootstrap UCL	5.394
		95% BCA Bootstrap UCL	6.825
		95% H-UCL	2.667

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.515	Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.45		
nu star	94.82		

A-D Test Statistic	10.3	Nonparametric Statistics	
5% A-D Critical Value	0.816	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.816	Mean	3.372
5% K-S Critical Value	0.0984	SD	19.29
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.21
		95% KM (t) UCL	5.368
		95% KM (z) UCL	5.361
		95% KM (jackknife) UCL	5.361
		95% KM (bootstrap t) UCL	10.18
		95% KM (BCA) UCL	5.716
		95% KM (Percentile Bootstrap) UCL	5.515
		95% KM (Chebyshev) UCL	8.644
		97.5% KM (Chebyshev) UCL	10.93
		99% KM (Chebyshev) UCL	15.41
		Potential UCLs to Use	
		95% KM (BCA) UCL	5.716
		95% Gamma Approximate UCL	4.602
		95% Adjusted Gamma UCL	4.611

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

cis-1,2-Dichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	224
Number of Distinct Detected Data	156	Number of Non-Detect Data	37
		Percent Non-Detects	14.18%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.25	Minimum Detected	-1.386
Maximum Detected	390000	Maximum Detected	12.87
Mean of Detected	4407	Mean of Detected	3.834
SD of Detected	28872	SD of Detected	2.987
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5	Maximum Non-Detect	-0.693

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.0648
Lilliefors Test Statistic	0.452	5% Lilliefors Critical Value	0.0592
5% Lilliefors Critical Value	0.0592	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3782	Mean	3.094
SD	26783	SD	3.314
95% DL/2 (t) UCL	6519	95% H-Stat (DL/2) UCL	13952

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	2.991
		SD in Log Scale	3.504
		Mean in Original Scale	3782
		SD in Original Scale	26783
		95% t UCL	6519
		95% Percentile Bootstrap UCL	6827
		95% BCA Bootstrap UCL	8563
		95% H-UCL	26808

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.167	Data do not follow a Discernable Distribution (0.05)	
Theta Star	26404		
nu star	74.77		

A-D Test Statistic	25.27	Nonparametric Statistics	
5% A-D Critical Value	0.985	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.985	Mean	3782
5% K-S Critical Value	0.0691	SD	26732
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1658
		95% KM (t) UCL	6520
		95% KM (z) UCL	6510
		95% KM (jackknife) UCL	6519
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	11078
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	7039
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	6825
Maximum	390000	95% KM (Chebyshev) UCL	11011
Mean	3782	97.5% KM (Chebyshev) UCL	14139
Median	26	99% KM (Chebyshev) UCL	20283
SD	26783		
k star	0.117	Potential UCLs to Use	
Theta star	32421	97.5% KM (Chebyshev) UCL	14139
Nu star	60.9		
AppChi2	43.95		
95% Gamma Approximate UCL	5241		
95% Adjusted Gamma UCL	5250		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

trans-1,2-Dichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	84
Number of Distinct Detected Data	74	Number of Non-Detect Data	177
		Percent Non-Detects	67.82%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	1300	Maximum Detected	7.17
Mean of Detected	52.01	Mean of Detected	1.074
SD of Detected	195.6	SD of Detected	2.13
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	257
Number treated as Detected	4
Single DL Non-Detect Percentage	98.47%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.134
Lilliefors Test Statistic	0.431	5% Lilliefors Critical Value	0.0967
5% Lilliefors Critical Value	0.0967	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	19.31	Mean	-0.247
SD	114.3	SD	1.829
95% DL/2 (t) UCL	30.99	95% H-Stat (DL/2) UCL	5.806

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.922
		SD in Log Scale	2.22
		Mean in Original Scale	16.98
		SD in Original Scale	113.1
		95% t UCL	28.54
		95% Percentile Bootstrap UCL	29.03
		95% BCA Bootstrap UCL	34.48
		95% H-UCL	7.425

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.246	Data do not follow a Discernable Distribution (0.05)	
Theta Star	211.1		
nu star	41.4		

A-D Test Statistic	10.2	Nonparametric Statistics	
5% A-D Critical Value	0.89	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.89	Mean	17.04
5% K-S Critical Value	0.107	SD	112.9
Data not Gamma Distributed at 5% Significance Level		SE of Mean	7.031
		95% KM (t) UCL	28.64
		95% KM (z) UCL	28.6
		95% KM (jackknife) UCL	28.6
		95% KM (bootstrap t) UCL	41.1
		95% KM (BCA) UCL	29.71
		95% KM (Percentile Bootstrap) UCL	28.76
		95% KM (Chebyshev) UCL	47.68
		97.5% KM (Chebyshev) UCL	60.95
		99% KM (Chebyshev) UCL	87
		229.6	
		38.48	Potential UCLs to Use
		25.27	97.5% KM (Chebyshev) UCL
		25.77	
		25.83	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Methyl tert-butyl ether

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	111
Number of Distinct Detected Data	85	Number of Non-Detect Data	150
		Percent Non-Detects	57.47%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.1	Minimum Detected	-2.303
Maximum Detected	330	Maximum Detected	5.799
Mean of Detected	10.14	Mean of Detected	0.445
SD of Detected	43.77	SD of Detected	1.633
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.136
Lilliefors Test Statistic	0.409	5% Lilliefors Critical Value	0.0841
5% Lilliefors Critical Value	0.0841	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	9.333	Mean	-0.085
SD	40.38	SD	1.731
95% DL/2 (t) UCL	13.46	95% H-Stat (DL/2) UCL	5.564

Maximum Likelihood Estimate(MLE) Method
 MLE method failed to converge properly

N/A	Log ROS Method	
	Mean in Log Scale	-0.519
	SD in Log Scale	1.573
	Mean in Original Scale	4.577
	SD in Original Scale	28.87
	95% t UCL	7.528
	95% Percentile Bootstrap UCL	7.918
	95% BCA Bootstrap UCL	9.442
	95% H-UCL	2.657

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.354	Data do not follow a Discernable Distribution (0.05)	
Theta Star	28.6		
nu star	78.68		

A-D Test Statistic	10.33	Nonparametric Statistics	
5% A-D Critical Value	0.854	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.854	Mean	4.656
5% K-S Critical Value	0.0933	SD	29
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.815
		95% KM (t) UCL	7.651
		95% KM (z) UCL	7.641
		95% KM (jackknife) UCL	7.644
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	19.5
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	8.139
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	8.087
Maximum	330	95% KM (Chebyshev) UCL	12.57
Mean	4.647	97.5% KM (Chebyshev) UCL	15.99
Median	1.00E-06	99% KM (Chebyshev) UCL	22.71
SD	28.91		
k star	0.0993		
Theta star	46.79		
Nu star	51.85	Potential UCLs to Use	
AppChi2	36.31	95% KM (Chebyshev) UCL	12.57
95% Gamma Approximate UCL	6.636		
95% Adjusted Gamma UCL	6.649		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Methylene chloride

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	21
Number of Distinct Detected Data	20	Number of Non-Detect Data	240
		Percent Non-Detects	91.95%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.23	Minimum Detected	-1.47
Maximum Detected	7	Maximum Detected	1.946
Mean of Detected	1.238	Mean of Detected	-0.292
SD of Detected	1.582	SD of Detected	0.956
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	261
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.646
Shapiro Wilk Test Statistic	0.646	5% Shapiro Wilk Critical Value	0.908
5% Shapiro Wilk Critical Value	0.908	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.241	Mean	-0.726
SD	28.92	SD	1.397
95% DL/2 (t) UCL	8.197	95% H-Stat (DL/2) UCL	1.593

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.001
		SD in Log Scale	0.648
		Mean in Original Scale	0.47
		SD in Original Scale	0.538
		95% t UCL	0.525
		95% Percentile Bootstrap UCL	0.527
		95% BCA Bootstrap UCL	0.55
		95% H-UCL	0.489

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.997	Data appear Lognormal at 5% Significance Level	
Theta Star	1.241		
nu star	41.89		

A-D Test Statistic	1.171	Nonparametric Statistics	
5% A-D Critical Value	0.767	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.767	Mean	0.433
5% K-S Critical Value	0.194	SD	0.536
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0428

Assuming Gamma Distribution		95% KM (t) UCL	0.504
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	0.503
Minimum	1.00E-06	95% KM (jackknife) UCL	0.504
Maximum	7	95% KM (bootstrap t) UCL	0.536
Mean	0.703	95% KM (BCA) UCL	0.505
Median	0.606	95% KM (Percentile Bootstrap) UCL	0.506
SD	0.72	95% KM (Chebyshev) UCL	0.619
k star	0.239	97.5% KM (Chebyshev) UCL	0.7
Theta star	2.936	99% KM (Chebyshev) UCL	0.858
Nu star	125	Potential UCLs to Use	
AppChi2	100.2	95% KM (t) UCL	0.504
95% Gamma Approximate UCL	0.877	95% KM (% Bootstrap) UCL	0.506
95% Adjusted Gamma UCL	0.878		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Tetrachloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	112
Number of Distinct Detected Data	86	Number of Non-Detect Data	149
		Percent Non-Detects	57.09%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.12	Minimum Detected	-2.12
Maximum Detected	1600	Maximum Detected	7.378
Mean of Detected	20.4	Mean of Detected	0.428
SD of Detected	151.7	SD of Detected	1.551
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	260
Number treated as Detected	1
Single DL Non-Detect Percentage	99.62%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.131
Lilliefors Test Statistic	0.447	5% Lilliefors Critical Value	0.0837
5% Lilliefors Critical Value	0.0837	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	13.55	Mean	-0.166
SD	103.4	SD	1.669
95% DL/2 (t) UCL	24.11	95% H-Stat (DL/2) UCL	4.542

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.618
		SD in Log Scale	1.574
		Mean in Original Scale	8.972
		SD in Original Scale	99.62
		95% t UCL	19.15
		95% Percentile Bootstrap UCL	21.02
		95% BCA Bootstrap UCL	27.89
		95% H-UCL	2.415

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.27	Data do not follow a Discernable Distribution (0.05)	
Theta Star	75.64		
nu star	60.4		

A-D Test Statistic	19.72	Nonparametric Statistics	
5% A-D Critical Value	0.881	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.881	Mean	9.055
5% K-S Critical Value	0.0943	SD	99.44
Data not Gamma Distributed at 5% Significance Level		SE of Mean	6.184
		95% KM (t) UCL	19.26
		95% KM (z) UCL	19.23
		95% KM (jackknife) UCL	19.24
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	85.98
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	21.14
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	21.32
Maximum	1600	95% KM (Chebyshev) UCL	36.01
Mean	9.132	97.5% KM (Chebyshev) UCL	47.67
Median	1.00E-06	99% KM (Chebyshev) UCL	70.59
SD	99.65		
k star	0.0882		
Theta star	103.5		
Nu star	46.05	Potential UCLs to Use	
AppChi2	31.48	95% KM (Chebyshev) UCL	36.01
95% Gamma Approximate UCL	13.36		
95% Adjusted Gamma UCL	13.39		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,2,3-Trichlorobenzene

General Statistics - Data are in µg/L.

Number of Valid Data	258	Number of Detected Data	36
Number of Distinct Detected Data	32	Number of Non-Detect Data	222
		Percent Non-Detects	86.05%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.12	Minimum Detected	-2.12
Maximum Detected	280	Maximum Detected	5.635
Mean of Detected	19.25	Mean of Detected	1.013
SD of Detected	50.35	SD of Detected	1.914
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	258
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.429
Shapiro Wilk Test Statistic	0.429	5% Shapiro Wilk Critical Value	0.935
5% Shapiro Wilk Critical Value	0.935	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.654	Mean	-0.562
SD	34.77	SD	1.606
95% DL/2 (t) UCL	11.23	95% H-Stat (DL/2) UCL	2.71

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.207
		SD in Log Scale	2.201
		Mean in Original Scale	2.856
		SD in Original Scale	19.73
		95% t UCL	4.883
		95% Percentile Bootstrap UCL	5.055
		95% BCA Bootstrap UCL	6.391
		95% H-UCL	1.962

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.336	Data do not follow a Discernable Distribution (0.05)	
Theta Star	57.28		
nu star	24.2		

A-D Test Statistic	3.064	Nonparametric Statistics	
5% A-D Critical Value	0.846	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.846	Mean	2.955
5% K-S Critical Value	0.158	SD	19.83
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.262
		95% KM (t) UCL	5.038
		95% KM (z) UCL	5.03
		95% KM (jackknife) UCL	5.013
		95% KM (bootstrap t) UCL	7.974
		95% KM (BCA) UCL	5.313
		95% KM (Percentile Bootstrap) UCL	5.309
		95% KM (Chebyshev) UCL	8.455
		97.5% KM (Chebyshev) UCL	10.83
		99% KM (Chebyshev) UCL	15.51
		42.54	
		37.96	Potential UCLs to Use
		24.85	95% KM (Chebyshev) UCL
		4.779	
		4.791	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,2,4-Trichlorobenzene

General Statistics - Data are in µg/L.

Number of Valid Data	258	Number of Detected Data	44
Number of Distinct Detected Data	36	Number of Non-Detect Data	214
		Percent Non-Detects	82.95%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.1	Minimum Detected	-2.303
Maximum Detected	1600	Maximum Detected	7.378
Mean of Detected	88.77	Mean of Detected	2.116
SD of Detected	253.4	SD of Detected	2.329
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	257
Number treated as Detected	1
Single DL Non-Detect Percentage	99.61%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.387
Shapiro Wilk Test Statistic	0.387	5% Shapiro Wilk Critical Value	0.944
5% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	18.49	Mean	-0.401
SD	111	SD	1.862
95% DL/2 (t) UCL	29.89	95% H-Stat (DL/2) UCL	5.344

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.639
		SD in Log Scale	2.751
		Mean in Original Scale	15.47
		SD in Original Scale	108.9
		95% t UCL	26.66
		95% Percentile Bootstrap UCL	27.59
		95% BCA Bootstrap UCL	38.91
		95% H-UCL	16.93

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.287	Data appear Lognormal at 5% Significance Level	
Theta Star	308.8		
nu star	25.3		

A-D Test Statistic	2.611	Nonparametric Statistics	
5% A-D Critical Value	0.864	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.864	Mean	15.53
5% K-S Critical Value	0.145	SD	108.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	6.854
		95% KM (t) UCL	26.85
		95% KM (z) UCL	26.81
		95% KM (jackknife) UCL	26.74
		95% KM (bootstrap t) UCL	44.51
		95% KM (BCA) UCL	28.11
		95% KM (Percentile Bootstrap) UCL	28.04
		95% KM (Chebyshev) UCL	45.41
		97.5% KM (Chebyshev) UCL	58.34
		99% KM (Chebyshev) UCL	83.73
		236.5	
		34.13	Potential UCLs to Use
		21.77	97.5% KM (Chebyshev) UCL
		24.52	
		24.59	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

1,1,2-Trichloroethane

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	26
Number of Distinct Detected Data	26	Number of Non-Detect Data	235
		Percent Non-Detects	90.04%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.265	Minimum Detected	-1.328
Maximum Detected	120	Maximum Detected	4.787
Mean of Detected	10.37	Mean of Detected	0.618
SD of Detected	26.74	SD of Detected	1.635
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.426
Shapiro Wilk Test Statistic	0.426	5% Shapiro Wilk Critical Value	0.92
5% Shapiro Wilk Critical Value	0.92	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.117	Mean	-0.649
SD	30.09	SD	1.498
95% DL/2 (t) UCL	9.192	95% H-Stat (DL/2) UCL	2.039

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.047
		SD in Log Scale	1.23
		Mean in Original Scale	1.444
		SD in Original Scale	8.818
		95% t UCL	2.345
		95% Percentile Bootstrap UCL	2.504
		95% BCA Bootstrap UCL	3.055
		95% H-UCL	0.893

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.366	Data do not follow a Discernable Distribution (0.05)	
Theta Star	28.33		
nu star	19.03		

A-D Test Statistic	3.182	Nonparametric Statistics	
5% A-D Critical Value	0.833	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.833	Mean	1.444
5% K-S Critical Value	0.184	SD	8.889
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.568
		95% KM (t) UCL	2.382
		95% KM (z) UCL	2.378
		95% KM (jackknife) UCL	2.366
		95% KM (bootstrap t) UCL	5.641
		95% KM (BCA) UCL	2.534
		95% KM (Percentile Bootstrap) UCL	2.477
		95% KM (Chebyshev) UCL	3.92
		97.5% KM (Chebyshev) UCL	4.991
		99% KM (Chebyshev) UCL	7.095
		26.95	
		48.35	Potential UCLs to Use
		33.39	95% KM (Chebyshev) UCL
		3.615	
		3.623	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	237
Number of Distinct Detected Data	157	Number of Non-Detect Data	24
		Percent Non-Detects	9.20%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.28	Minimum Detected	-1.273
Maximum Detected	170000	Maximum Detected	12.04
Mean of Detected	2444	Mean of Detected	4.265
SD of Detected	13070	SD of Detected	2.802
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5	Maximum Non-Detect	-0.693

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.0472
Lilliefors Test Statistic	0.426	5% Lilliefors Critical Value	0.0576
5% Lilliefors Critical Value	0.0576	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2219	Mean	3.745
SD	12472	SD	3.131
95% DL/2 (t) UCL	3494	95% H-Stat (DL/2) UCL	13510

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	1082	Mean in Log Scale	3.711
SD	13310	SD in Log Scale	3.21
95% MLE (t) UCL	2442	Mean in Original Scale	2219
95% MLE (Tiku) UCL	2336	SD in Original Scale	12472
		95% t UCL	3494
		95% Percentile Bootstrap UCL	3642
		95% BCA Bootstrap UCL	4366
		95% H UCL	17417

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.207	Data appear Lognormal at 5% Significance Level	
Theta Star	11797		
nu star	98.2		

A-D Test Statistic	17.46	Nonparametric Statistics	
5% A-D Critical Value	0.912	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.912	Mean	2219
5% K-S Critical Value	0.0657	SD	12448
Data not Gamma Distributed at 5% Significance Level		SE of Mean	772.2
		95% KM (t) UCL	3494
		95% KM (z) UCL	3489
		95% KM (jackknife) UCL	3494
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	5289
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	3679
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	3612
Maximum	170000	95% KM (Chebyshev) UCL	5585
Mean	2219	97.5% KM (Chebyshev) UCL	7041
Median	40	99% KM (Chebyshev) UCL	9902
SD	12472	Potential UCLs to Use	
k star	0.151	97.5% KM (Chebyshev) UCL	7041
Theta star	14661		
Nu star	79.01		
AppChi2	59.54		
95% Gamma Approximate UCL	2945		
95% Adjusted Gamma UCL	2950		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Vinyl chloride

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	64
Number of Distinct Detected Data	57	Number of Non-Detect Data	197
		Percent Non-Detects	75.48%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.36	Minimum Detected	-1.022
Maximum Detected	860	Maximum Detected	6.757
Mean of Detected	74.11	Mean of Detected	2.311
SD of Detected	168.9	SD of Detected	2.133
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	257
Number treated as Detected	4
Single DL Non-Detect Percentage	98.47%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.142
Lilliefors Test Statistic	0.331	5% Lilliefors Critical Value	0.111
5% Lilliefors Critical Value	0.111	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	20.89	Mean	-0.093
SD	90.54	SD	2.044
95% DL/2 (t) UCL	30.14	95% H-Stat (DL/2) UCL	10.99

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.04
		SD in Log Scale	3.443
		Mean in Original Scale	18.31
		SD in Original Scale	89.05
		95% t UCL	27.41
		95% Percentile Bootstrap UCL	28.09
		95% BCA Bootstrap UCL	31.42
		95% H-UCL	136.8

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.333	Data do not follow a Discernable Distribution (0.05)	
Theta Star	222.2		
nu star	42.68		

A-D Test Statistic	3.144	Nonparametric Statistics	
5% A-D Critical Value	0.855	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.855	Mean	18.57
5% K-S Critical Value	0.12	SD	88.88
Data not Gamma Distributed at 5% Significance Level		SE of Mean	5.549
		95% KM (t) UCL	27.73
		95% KM (z) UCL	27.7
		95% KM (jackknife) UCL	27.68
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	31.92
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	28.84
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	27.96
Maximum	860	95% KM (Chebyshev) UCL	42.76
Mean	18.17	97.5% KM (Chebyshev) UCL	53.23
Median	1.00E-06	99% KM (Chebyshev) UCL	73.78
SD	89.08		
k star	0.0685		
Theta star	265.4		
Nu star	35.74	Potential UCLs to Use	
AppChi2	23.06	97.5% KM (Chebyshev) UCL	53.23
95% Gamma Approximate UCL	28.16		
95% Adjusted Gamma UCL	28.23		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Bis(2-ethylhexyl)phthalate

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	29
Number of Distinct Detected Data	26	Number of Non-Detect Data	233
		Percent Non-Detects	88.93%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.1	Minimum Detected	0.0953
Maximum Detected	220	Maximum Detected	5.394
Mean of Detected	13.81	Mean of Detected	1.535
SD of Detected	40.81	SD of Detected	1.101
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5.6	Maximum Non-Detect	1.723

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	255
Number treated as Detected	7
Single DL Non-Detect Percentage	97.33%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only			
Shapiro Wilk Test Statistic	0.311	Shapiro Wilk Test Statistic	0.811
5% Shapiro Wilk Critical Value	0.926	5% Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.756	Mean	0.986
SD	13.83	SD	0.41
95% DL/2 (t) UCL	5.166	95% H-Stat (DL/2) UCL	3.048

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	1.117
		SD in Log Scale	0.742
		Mean in Original Scale	4.712
		SD in Original Scale	13.92
		95% t UCL	6.132
		95% Percentile Bootstrap UCL	6.3
		95% BCA Bootstrap UCL	7.438
		95% H-UCL	4.4

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.535	Data do not follow a Discernable Distribution (0.05)	
Theta Star	25.83		
nu star	31.01		

A-D Test Statistic	4.539	Nonparametric Statistics	
5% A-D Critical Value	0.804	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.804	Mean	4.186
5% K-S Critical Value	0.171	SD	13.8
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.892
		95% KM (t) UCL	5.659
		95% KM (z) UCL	5.654
		95% KM (jackknife) UCL	5.641
	1.00E-06	95% KM (bootstrap t) UCL	8.548
	220	95% KM (BCA) UCL	5.731
	9.005	95% KM (Percentile Bootstrap) UCL	5.801
	3.858	95% KM (Chebyshev) UCL	8.076
	16.31	97.5% KM (Chebyshev) UCL	9.76
	0.142	99% KM (Chebyshev) UCL	13.07
	63.45		
	74.36	Potential UCLs to Use	
	55.5	95% KM (BCA) UCL	5.731
	12.06		
	12.08		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Dibenzo(a,h)anthracene

General Statistics - Data are in µg/L.

Number of Valid Data	260	Number of Detected Data	31
Number of Distinct Detected Data	18	Number of Non-Detect Data	229
		Percent Non-Detects	88.08%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0735	Minimum Detected	-2.61
Maximum Detected	5.5	Maximum Detected	1.705
Mean of Detected	0.381	Mean of Detected	-1.887
SD of Detected	1.036	SD of Detected	0.947
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	259
Number treated as Detected	1
Single DL Non-Detect Percentage	99.62%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.314
Shapiro Wilk Test Statistic	0.314	5% Shapiro Wilk Critical Value	0.929
5% Shapiro Wilk Critical Value	0.929	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0993	Mean	-2.843
SD	0.398	SD	0.537
95% DL/2 (t) UCL	0.14	95% H-Stat (DL/2) UCL	0.0715

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.566
		SD in Log Scale	0.591
		Mean in Original Scale	0.113
		SD in Original Scale	0.367
		95% t UCL	0.151
		95% Percentile Bootstrap UCL	0.155
		95% BCA Bootstrap UCL	0.179
		95% H-UCL	0.0979

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.618	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.618		
nu star	38.3		

A-D Test Statistic	7.093	Nonparametric Statistics	
5% A-D Critical Value	0.796	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.796	Mean	0.126
5% K-S Critical Value	0.165	SD	0.364
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0231

Assuming Gamma Distribution		95% KM (t) UCL	0.165
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	0.164
Minimum	1.00E-06	95% KM (jackknife) UCL	0.164
Maximum	5.5	95% KM (bootstrap t) UCL	0.366
Mean	0.148	95% KM (BCA) UCL	0.174
Median	0.0748	95% KM (Percentile Bootstrap) UCL	0.168
SD	0.387	95% KM (Chebyshev) UCL	0.227
k star	0.166	97.5% KM (Chebyshev) UCL	0.271
Theta star	0.894	99% KM (Chebyshev) UCL	0.356
Nu star	86.15	Potential UCLs to Use	
AppChi2	65.76	95% KM (t) UCL	0.165
95% Gamma Approximate UCL	0.194	95% KM (% Bootstrap) UCL	0.168
95% Adjusted Gamma UCL	0.194		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics - Data are in µg/L.

Number of Valid Data	261	Number of Detected Data	60
Number of Distinct Detected Data	14	Number of Non-Detect Data	201
		Percent Non-Detects	77.01%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.08	Minimum Detected	-2.526
Maximum Detected	3.1	Maximum Detected	1.131
Mean of Detected	0.242	Mean of Detected	-1.881
SD of Detected	0.514	SD of Detected	0.649
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	0
Single DL Non-Detect Percentage	100.00%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only			
Lilliefors Test Statistic	0.447	Lilliefors Test Statistic	0.36
5% Lilliefors Critical Value	0.114	5% Lilliefors Critical Value	0.114
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.104	Mean	-2.723
SD	0.298	SD	0.605
95% DL/2 (t) UCL	0.134	95% H-Stat (DL/2) UCL	0.0846

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-3.239
		SD in Log Scale	1.049
		Mean in Original Scale	0.0814
		SD in Original Scale	0.261
		95% t UCL	0.108
		95% Percentile Bootstrap UCL	0.111
		95% BCA Bootstrap UCL	0.124
		95% H-UCL	0.0783

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	1.173	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.206		
nu star	140.8		

A-D Test Statistic	13.2	Nonparametric Statistics	
5% A-D Critical Value	0.775	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.775	Mean	0.117
5% K-S Critical Value	0.117	SD	0.254
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0159
		95% KM (t) UCL	0.144
		95% KM (z) UCL	0.143
		95% KM (jackknife) UCL	0.139
	1.00E-06	95% KM (bootstrap t) UCL	0.23
	3.1	95% KM (BCA) UCL	0.163
	0.0567	95% KM (Percentile Bootstrap) UCL	0.154
	1.00E-06	95% KM (Chebyshev) UCL	0.187
	0.265	97.5% KM (Chebyshev) UCL	0.217
	0.104	99% KM (Chebyshev) UCL	0.275
	0.543		
	54.51	Potential UCLs to Use	
	38.54	95% KM (t) UCL	0.144
	0.0802	95% KM (% Bootstrap) UCL	0.154
	0.0804		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	65
Number of Distinct Detected Data	31	Number of Non-Detect Data	197
		Percent Non-Detects	75.19%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.03	Minimum Detected	-3.507
Maximum Detected	14	Maximum Detected	2.639
Mean of Detected	0.635	Mean of Detected	-1.628
SD of Detected	1.96	SD of Detected	1.122
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	211
Number treated as Detected	51
Single DL Non-Detect Percentage	80.53%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.429
Lilliefors Test Statistic	0.429	5% Lilliefors Critical Value	0.11
5% Lilliefors Critical Value	0.11	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.195	Mean	-2.656
SD	1.003	SD	0.811
95% DL/2 (t) UCL	0.298	95% H-Stat (DL/2) UCL	0.108

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.87
		SD in Log Scale	1.16
		Mean in Original Scale	0.195
		SD in Original Scale	1.004
		95% t UCL	0.298
		95% Percentile Bootstrap UCL	0.313
		95% BCA Bootstrap UCL	0.381
		95% H-UCL	0.131

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.521	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.22		
nu star	67.69		

A-D Test Statistic	11.99	Nonparametric Statistics	
5% A-D Critical Value	0.813	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.813	Mean	0.216
5% K-S Critical Value	0.117	SD	0.998
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0624
		95% KM (t) UCL	0.319
		95% KM (z) UCL	0.318
		95% KM (jackknife) UCL	0.318
		95% KM (bootstrap t) UCL	0.477
	1.00E-06	95% KM (BCA) UCL	0.341
	14	95% KM (Percentile Bootstrap) UCL	0.327
	0.185	95% KM (Chebyshev) UCL	0.488
	1.00E-06	97.5% KM (Chebyshev) UCL	0.606
	1.008	99% KM (Chebyshev) UCL	0.837
	0.108		
	1.716		
	56.56	Potential UCLs to Use	
	40.27	95% KM (BCA) UCL	0.341
	0.26		
	0.261		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Total Polychlorinated Biphenyls

General Statistics - Data are in µg/L.

Number of Valid Data	259	Number of Detected Data	72
Number of Distinct Detected Data	64	Number of Non-Detect Data	187
		Percent Non-Detects	72.20%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.031	Minimum Detected	-3.474
Maximum Detected	81	Maximum Detected	4.394
Mean of Detected	5.116	Mean of Detected	-0.502
SD of Detected	13.84	SD of Detected	2.041
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	202
Number treated as Detected	57
Single DL Non-Detect Percentage	77.99%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.357
Lilliefors Test Statistic	0.357	5% Lilliefors Critical Value	0.104
5% Lilliefors Critical Value	0.104	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.449	Mean	-2.55
SD	7.612	SD	1.684
95% DL/2 (t) UCL	2.23	95% H-Stat (DL/2) UCL	0.431

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-4.193
		SD in Log Scale	3.168
		Mean in Original Scale	1.435
		SD in Original Scale	7.614
		95% t UCL	2.216
		95% Percentile Bootstrap UCL	2.263
		95% BCA Bootstrap UCL	2.663
		95% H-UCL	5.533

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.316	Data do not follow a Discernable Distribution (0.05)	
Theta Star	16.2		
nu star	45.47		

A-D Test Statistic	5.421	Nonparametric Statistics	
5% A-D Critical Value	0.861	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.861	Mean	1.451
5% K-S Critical Value	0.114	SD	7.596
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.475
		95% KM (t) UCL	2.236
		95% KM (z) UCL	2.233
		95% KM (jackknife) UCL	2.232
	1.00E-06	95% KM (bootstrap t) UCL	2.906
Minimum	81	95% KM (BCA) UCL	2.417
Maximum	1.422	95% KM (Percentile Bootstrap) UCL	2.267
Mean	1.422	95% KM (Chebyshev) UCL	3.523
Median	1.00E-06	97.5% KM (Chebyshev) UCL	4.419
SD	7.617	99% KM (Chebyshev) UCL	6.18
k star	0.0814		
Theta star	17.48		
Nu star	42.15	Potential UCLs to Use	
AppChi2	28.27	97.5% KM (Chebyshev) UCL	4.419
95% Gamma Approximate UCL	2.121		
95% Adjusted Gamma UCL	2.125		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

gamma-Chlordane

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	16
Number of Distinct Detected Data	16	Number of Non-Detect Data	246
		Percent Non-Detects	93.89%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.029	Minimum Detected	-3.54
Maximum Detected	370	Maximum Detected	5.914
Mean of Detected	25.51	Mean of Detected	-0.812
SD of Detected	92.03	SD of Detected	2.759
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	26	Maximum Non-Detect	3.258

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	261
Number treated as Detected	1
Single DL Non-Detect Percentage	99.62%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.872
Shapiro Wilk Test Statistic	0.307	5% Shapiro Wilk Critical Value	0.887
5% Shapiro Wilk Critical Value	0.887	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.631	Mean	-3.477
SD	22.9	SD	1.025
95% DL/2 (t) UCL	3.967	95% H-Stat (DL/2) UCL	0.0599

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-4.322
		SD in Log Scale	2.094
		Mean in Original Scale	1.594
		SD in Original Scale	22.89
		95% t UCL	3.929
		95% Percentile Bootstrap UCL	4.396
		95% BCA Bootstrap UCL	7.185
		95% H-UCL	0.18

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.191	Data do not follow a Discernable Distribution (0.05)	
Theta Star	133.4		
nu star	6.118		

A-D Test Statistic	2.266	Nonparametric Statistics	
5% A-D Critical Value	0.884	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.884	Mean	1.587
5% K-S Critical Value	0.238	SD	22.85
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.458
		95% KM (t) UCL	3.993
		95% KM (z) UCL	3.985
		95% KM (jackknife) UCL	3.921
		95% KM (bootstrap t) UCL	63.57
	1.00E-06	95% KM (BCA) UCL	4.433
	370	95% KM (Percentile Bootstrap) UCL	4.341
	3.112	95% KM (Chebyshev) UCL	7.942
	1.00E-06	97.5% KM (Chebyshev) UCL	10.69
	23.29	99% KM (Chebyshev) UCL	16.09
	0.0721		
	43.17		
	37.77	Potential UCLs to Use	
	24.7	97.5% KM (Chebyshev) UCL	10.69
	4.759		
	4.771		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

4,4'-DDD

General Statistics - Data are in µg/L.

Number of Valid Data	84	Number of Detected Data	13
Number of Distinct Detected Data	13	Number of Non-Detect Data	71
		Percent Non-Detects	84.52%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.09	Minimum Detected	-2.408
Maximum Detected	1800	Maximum Detected	7.496
Mean of Detected	139.1	Mean of Detected	-0.211
SD of Detected	499	SD of Detected	2.515
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	72
Number treated as Detected	12
Single DL Non-Detect Percentage	85.71%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.312
Shapiro Wilk Test Statistic	0.312	5% Shapiro Wilk Critical Value	0.866
5% Shapiro Wilk Critical Value	0.866	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	21.56	Mean	-2.548
SD	196.4	SD	1.388
95% DL/2 (t) UCL	57.21	95% H-Stat (DL/2) UCL	0.307

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-4.405
		SD in Log Scale	2.914
		Mean in Original Scale	21.55
		SD in Original Scale	196.4
		95% t UCL	57.19
		95% Percentile Bootstrap UCL	64.41
		95% BCA Bootstrap UCL	107.2
		95% H-UCL	3.68

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.166	Data do not follow a Discernable Distribution (0.05)	
Theta Star	836.6		
nu star	4.322		

A-D Test Statistic	3.416	Nonparametric Statistics	
5% A-D Critical Value	0.887	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.887	Mean	21.6
5% K-S Critical Value	0.264	SD	195.2
Data not Gamma Distributed at 5% Significance Level		SE of Mean	22.17
		95% KM (t) UCL	58.47
		95% KM (z) UCL	58.06
		95% KM (jackknife) UCL	57.22
		95% KM (bootstrap t) UCL	22993
	1.00E-06	95% KM (BCA) UCL	85.85
	1800	95% KM (Percentile Bootstrap) UCL	64.46
	21.52	95% KM (Chebyshev) UCL	118.2
	1.00E-06	97.5% KM (Chebyshev) UCL	160
	196.4	99% KM (Chebyshev) UCL	242.2
	0.0642		
	335.2		
	10.79	Potential UCLs to Use	
	4.44	97.5% KM (Chebyshev) UCL	160
	52.29		
	53.14		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

4,4'-DDE

General Statistics - Data are in µg/L.

Number of Valid Data	259	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	242
		Percent Non-Detects	93.44%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.085	Minimum Detected	-2.465
Maximum Detected	1600	Maximum Detected	7.378
Mean of Detected	111	Mean of Detected	0.395
SD of Detected	388.8	SD of Detected	2.705
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	244
Number treated as Detected	15
Single DL Non-Detect Percentage	94.21%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Test Statistic	0.323	5% Shapiro Wilk Critical Value	0.892
5% Shapiro Wilk Critical Value	0.892	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.334	Mean	-2.766
SD	100.7	SD	1.077
95% DL/2 (t) UCL	17.66	95% H-Stat (DL/2) UCL	0.13

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-3.959
		SD in Log Scale	2.507
		Mean in Original Scale	7.361
		SD in Original Scale	100.7
		95% t UCL	17.69
		95% Percentile Bootstrap UCL	19.72
		95% BCA Bootstrap UCL	30.99
		95% H-UCL	0.788

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.183	Data do not follow a Discernable Distribution (0.05)	
Theta Star	607.7		
nu star	6.212		

A-D Test Statistic	2.889	Nonparametric Statistics	
5% A-D Critical Value	0.892	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.892	Mean	7.371
5% K-S Critical Value	0.232	SD	100.5
Data not Gamma Distributed at 5% Significance Level		SE of Mean	6.434
		95% KM (t) UCL	17.99
		95% KM (z) UCL	17.95
		95% KM (jackknife) UCL	17.7
		95% KM (bootstrap t) UCL	1068
	1.00E-06	95% KM (BCA) UCL	19.75
	1600	95% KM (Percentile Bootstrap) UCL	19.7
	10.99	95% KM (Chebyshev) UCL	35.42
	1.00E-06	97.5% KM (Chebyshev) UCL	47.55
	101.4	99% KM (Chebyshev) UCL	71.39
	0.0639		
	172		
	33.08	Potential UCLs to Use	
	20.93	97.5% KM (Chebyshev) UCL	47.55
	17.36		
	17.41		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

4,4'-DDT

General Statistics - Data are in µg/L.

Number of Valid Data	258	Number of Detected Data	24
Number of Distinct Detected Data	22	Number of Non-Detect Data	234
		Percent Non-Detects	90.70%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.13	Minimum Detected	-2.04
Maximum Detected	4000	Maximum Detected	8.294
Mean of Detected	205.2	Mean of Detected	0.58
SD of Detected	826.1	SD of Detected	2.627
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	234
Number treated as Detected	24
Single DL Non-Detect Percentage	90.70%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.274
Shapiro Wilk Test Statistic	0.274	5% Shapiro Wilk Critical Value	0.916
5% Shapiro Wilk Critical Value	0.916	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	19.13	Mean	-2.656
SD	254.2	SD	1.302
95% DL/2 (t) UCL	45.26	95% H-Stat (DL/2) UCL	0.199

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-12.06
		SD in Log Scale	7.017
		Mean in Original Scale	19.09
		SD in Original Scale	254.3
		95% t UCL	45.22
		95% Percentile Bootstrap UCL	49.95
		95% BCA Bootstrap UCL	78.1
		95% H-UCL	17322668

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.168	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1220		
nu star	8.071		

A-D Test Statistic	4.678	Nonparametric Statistics	
5% A-D Critical Value	0.911	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.911	Mean	19.2
5% K-S Critical Value	0.198	SD	253.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	16.14
		95% KM (t) UCL	45.84
		95% KM (z) UCL	45.75
		95% KM (jackknife) UCL	45.3
	1.00E-06	95% KM (bootstrap t) UCL	2166
Assuming Gamma Distribution	4000	95% KM (BCA) UCL	47.54
Gamma ROS Statistics using Extrapolated Data	19.08	95% KM (Percentile Bootstrap) UCL	47.33
Minimum	1.00E-06	95% KM (Chebyshev) UCL	89.54
Maximum	254.3	97.5% KM (Chebyshev) UCL	120
Mean	0.0581	99% KM (Chebyshev) UCL	179.8
Median	328.7		
SD	29.96	Potential UCLs to Use	
k star	18.46	97.5% KM (Chebyshev) UCL	120
Theta star	30.97		
Nu star	31.06		
AppChi2			
95% Gamma Approximate UCL			
95% Adjusted Gamma UCL			

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Heptachlor

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	16
Number of Distinct Detected Data	16	Number of Non-Detect Data	246
		Percent Non-Detects	93.89%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0615	Minimum Detected	-2.789
Maximum Detected	300	Maximum Detected	5.704
Mean of Detected	27.42	Mean of Detected	0.0962
SD of Detected	78.5	SD of Detected	2.445
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	0.056	Maximum Non-Detect	-2.882

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	246
Number treated as Detected	16
Single DL Non-Detect Percentage	93.89%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.407
Shapiro Wilk Test Statistic	0.407	5% Shapiro Wilk Critical Value	0.887
5% Shapiro Wilk Critical Value	0.887	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.698	Mean	-3.447
SD	19.93	SD	1.079
95% DL/2 (t) UCL	3.731	95% H-Stat (DL/2) UCL	0.066

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-14.48
		SD in Log Scale	7.209
		Mean in Original Scale	1.675
		SD in Original Scale	19.94
		95% t UCL	3.708
		95% Percentile Bootstrap UCL	3.969
		95% BCA Bootstrap UCL	6.001
		95% H-UCL	7321235

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.224	Data do not follow a Discernable Distribution (0.05)	
Theta Star	122.2		
nu star	7.177		

A-D Test Statistic	2.175	Nonparametric Statistics	
5% A-D Critical Value	0.868	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.868	Mean	1.732
5% K-S Critical Value	0.236	SD	19.89
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.269
		95% KM (t) UCL	3.827
		95% KM (z) UCL	3.82
		95% KM (jackknife) UCL	3.736
		95% KM (bootstrap t) UCL	76.48
	1.00E-06	95% KM (BCA) UCL	4.079
	300	95% KM (Percentile Bootstrap) UCL	4.031
	1.674	95% KM (Chebyshev) UCL	7.265
	1.00E-06	97.5% KM (Chebyshev) UCL	9.659
	19.94	99% KM (Chebyshev) UCL	14.36
	0.0653		
	25.65		
	34.2	Potential UCLs to Use	
	21.82	97.5% KM (Chebyshev) UCL	9.659
	2.624		
	2.63		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

2,3,7,8-TCDD Toxic Equivalence TEQ (pg/L)

General Statistics - Data are in pg/L.

Number of Valid Observations	37	Number of Distinct Observations	37
Raw Statistics		Log-transformed Statistics	
Minimum	8.10E-04	Minimum of Log Data	-7.118
Maximum	54	Maximum of Log Data	3.989
Mean	5.452	Mean of log Data	-1.406
Median	0.23	SD of log Data	3.038
SD	12.63		
Std. Error of Mean	2.076		
Coefficient of Variation	2.316		
Skewness	2.82		
Relevant UCL Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.501	Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical Value	0.936	Shapiro Wilk Critical Value	0.936
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	8.956	95% H-UCL	364.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	59.92
95% Adjusted-CLT UCL (Chen-1995)	9.894	97.5% Chebyshev (MVUE) UCL	79.62
95% Modified-t UCL (Johnson-1978)	9.116	99% Chebyshev (MVUE) UCL	118.3
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.231	Data appear Lognormal at 5% Significance Level	
Theta Star	23.6		
MLE of Mean	5.452		
MLE of Standard Deviation	11.34		
nu star	17.09		
Approximate Chi Square Value (.05)	8.738	Nonparametric Statistics	
Adjusted Level of Significance	0.0431	95% CLT UCL	8.866
Adjusted Chi Square Value	8.479	95% Jackknife UCL	8.956
		95% Standard Bootstrap UCL	8.797
Anderson-Darling Test Statistic	1.676	95% Bootstrap-t UCL	11.47
Anderson-Darling 5% Critical Value	0.887	95% Hall's Bootstrap UCL	9.015
Kolmogorov-Smirnov Test Statistic	0.185	95% Percentile Bootstrap UCL	9.114
Kolmogorov-Smirnov 5% Critical Value	0.16	95% BCA Bootstrap UCL	10.03
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	14.5
		97.5% Chebyshev(Mean, Sd) UCL	18.41
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26.1
95% Approximate Gamma UCL	10.66		
95% Adjusted Gamma UCL	10.99		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	26.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ENTIRE AQUIFER

Aluminum

General Statistics - Data are in $\mu\text{g/L}$.

Number of Valid Data	252	Number of Detected Data	79
Number of Distinct Detected Data	76	Number of Non-Detect Data	173
		Percent Non-Detects	68.65%

Raw Statistics	Log-transformed Statistics	
Minimum Detected	12.1	Minimum Detected 2.493
Maximum Detected	6210	Maximum Detected 8.734
Mean of Detected	436.5	Mean of Detected 5.028
SD of Detected	1044	SD of Detected 1.259
Minimum Non-Detect	200	Minimum Non-Detect 5.298
Maximum Non-Detect	200	Maximum Non-Detect 5.298

UCL Statistics	
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only
Lilliefors Test Statistic	0.352 Lilliefors Test Statistic 0.129
5% Lilliefors Critical Value	0.0997 5% Lilliefors Critical Value 0.0997
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level

Assuming Normal Distribution	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	205.5 Mean	4.738
SD	602.7 SD	0.729
95% DL/2 (t) UCL	268.2 95% H-Stat (DL/2) UCL	162.7

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.571
		SD in Log Scale	1.049
		Mean in Original Scale	211.3
		SD in Original Scale	605.6
		95% t UCL	274.3
		95% Percentile Bootstrap UCL	281.5
		95% BCA Bootstrap UCL	304.6
		95% H-UCL	193.5

Gamma Distribution Test with Detected Values Only	Data Distribution Test with Detected Values Only
k star (bias corrected)	0.575 Data do not follow a Discernable Distribution (0.05)
Theta Star	758.5
nu star	90.92

A-D Test Statistic	6.23	Nonparametric Statistics	
5% A-D Critical Value	0.81	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.81	Mean	197.8
5% K-S Critical Value	0.106	SD	604.2
Data not Gamma Distributed at 5% Significance Level		SE of Mean	38.65
		95% KM (t) UCL	261.6
Assuming Gamma Distribution		95% KM (z) UCL	261.4
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	261.4
Minimum	1.00E-06	95% KM (bootstrap t) UCL	318.3
Maximum	6210	95% KM (BCA) UCL	268.1
Mean	294	95% KM (Percentile Bootstrap) UCL	270
Median	106.5	95% KM (Chebyshev) UCL	366.3
SD	632.5	97.5% KM (Chebyshev) UCL	439.2
k star	0.135	99% KM (Chebyshev) UCL	582.3
Theta star	2173		
Nu star	68.18	Potential UCLs to Use	
AppChi2	50.17	95% KM (BCA) UCL	268.1
95% Gamma Approximate UCL	399.5		
95% Adjusted Gamma UCL	400.2		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics - Data are in µg/L.

Number of Valid Observations	262	Number of Distinct Observations	185
Raw Statistics	Log-transformed Statistics		
Minimum	0.68	Minimum of Log Data	-0.386
Maximum	829	Maximum of Log Data	6.72
Mean	47.72	Mean of log Data	2.485
Median	10.5	SD of log Data	1.66
SD	105		
Std. Error of Mean	6.487		
Coefficient of Variation	2.2		
Skewness	4.451		
Relevant UCL Statistics	Lognormal Distribution Test		
Normal Distribution Test			
Lilliefors Test Statistic	0.327	Lilliefors Test Statistic	0.0985
Lilliefors Critical Value	0.0547	Lilliefors Critical Value	0.0547
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	58.43	95% H-UCL	63.14
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	78.6
95% Adjusted-CLT UCL (Chen-1995)	60.3	97.5% Chebyshev (MVUE) UCL	92.27
95% Modified-t UCL (Johnson-1978)	58.73	99% Chebyshev (MVUE) UCL	119.1
Gamma Distribution Test	Data Distribution		
k star (bias corrected)	0.463	Data do not follow a Discernable Distribution (0.05)	
Theta Star	103.1		
MLE of Mean	47.72		
MLE of Standard Deviation	70.16		
nu star	242.4		
Approximate Chi Square Value (.05)	207.4	Nonparametric Statistics	
Adjusted Level of Significance	0.0491	95% CLT UCL	58.39
Adjusted Chi Square Value	207.2	95% Jackknife UCL	58.43
		95% Standard Bootstrap UCL	58.34
Anderson-Darling Test Statistic	10.97	95% Bootstrap-t UCL	61.38
Anderson-Darling 5% Critical Value	0.83	95% Hall's Bootstrap UCL	60.77
Kolmogorov-Smirnov Test Statistic	0.139	95% Percentile Bootstrap UCL	59.19
Kolmogorov-Smirnov 5% Critical Value	0.06	95% BCA Bootstrap UCL	60.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	76
		97.5% Chebyshev(Mean, Sd) UCL	88.23
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	112.3
95% Approximate Gamma UCL	55.79		
95% Adjusted Gamma UCL	55.83		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	76

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

ENTIRE AQUIFER

Barium

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	261
Number of Distinct Detected Data	233	Number of Non-Detect Data	1
		Percent Non-Detects	0.38%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	8.7	Minimum Detected	2.163
Maximum Detected	8790	Maximum Detected	9.081
Mean of Detected	325.2	Mean of Detected	4.93
SD of Detected	818.6	SD of Detected	1.177
Minimum Non-Detect	10	Minimum Non-Detect	2.303
Maximum Non-Detect	10	Maximum Non-Detect	2.303

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.35	Lilliefors Test Statistic	0.0853
5% Lilliefors Critical Value	0.0548	5% Lilliefors Critical Value	0.0548
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	324	Mean	4.917
SD	817.3	SD	1.193
95% DL/2 (t) UCL	407.3	95% H-Stat (DL/2) UCL	329.5

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	319.8	Mean in Log Scale	4.917
SD	819.7	SD in Log Scale	1.191
95% MLE (t) UCL	403.3	Mean in Original Scale	324
95% MLE (Tiku) UCL	393.7	SD in Original Scale	817.3
		95% t UCL	407.3
		95% Percentile Bootstrap UCL	414.4
		95% BCA Bootstrap UCL	446.7
		95% H UCL	329.1

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.701	Data do not follow a Discernable Distribution (0.05)	
Theta Star	464.1		
nu star	365.7		

A-D Test Statistic	12.65	Nonparametric Statistics	
5% A-D Critical Value	0.801	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.801	Mean	324
5% K-S Critical Value	0.0591	SD	815.7
Data not Gamma Distributed at 5% Significance Level		SE of Mean	50.49
		95% KM (t) UCL	407.3
		95% KM (z) UCL	407
		95% KM (jackknife) UCL	407.3
		95% KM (bootstrap t) UCL	485.9
		95% KM (BCA) UCL	407
		95% KM (Percentile Bootstrap) UCL	414.2
		95% KM (Chebyshev) UCL	544.1
		97.5% KM (Chebyshev) UCL	639.3
		99% KM (Chebyshev) UCL	826.4
		Potential UCLs to Use	
		95% KM (Chebyshev) UCL	544.1
			369
			369.3

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Cadmium

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	23
Number of Distinct Detected Data	19	Number of Non-Detect Data	239
		Percent Non-Detects	91.22%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.037	Minimum Detected	-3.297
Maximum Detected	16.8	Maximum Detected	2.821
Mean of Detected	1.261	Mean of Detected	-1.515
SD of Detected	3.526	SD of Detected	1.763
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	2	Maximum Non-Detect	0.693

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	260
Number treated as Detected	2
Single DL Non-Detect Percentage	99.24%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.373
Shapiro Wilk Test Statistic	0.373	5% Shapiro Wilk Critical Value	0.914
5% Shapiro Wilk Critical Value	0.914	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.569	Mean	-0.763
SD	1.046	SD	0.565
95% DL/2 (t) UCL	0.675	95% H-Stat (DL/2) UCL	0.583

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.36
		SD in Log Scale	1.266
		Mean in Original Scale	0.258
		SD in Original Scale	1.085
		95% t UCL	0.368
		95% Percentile Bootstrap UCL	0.377
		95% BCA Bootstrap UCL	0.523
		95% H-UCL	0.253

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.359	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.509		
nu star	16.53		

A-D Test Statistic	2.078	Nonparametric Statistics	
5% A-D Critical Value	0.831	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.831	Mean	0.23
5% K-S Critical Value	0.195	SD	1.078
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0757

Assuming Gamma Distribution		95% KM (t) UCL	0.355
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	0.355
Minimum	1.00E-06	95% KM (jackknife) UCL	0.354
Maximum	16.8	95% KM (bootstrap t) UCL	0.512
Mean	0.679	95% KM (BCA) UCL	0.384
Median	0.044	95% KM (Percentile Bootstrap) UCL	0.366
SD	1.348	95% KM (Chebyshev) UCL	0.56
k star	0.128	97.5% KM (Chebyshev) UCL	0.703
Theta star	5.328	99% KM (Chebyshev) UCL	0.983
Nu star	66.83	Potential UCLs to Use	
AppChi2	49.01	95% KM (Chebyshev) UCL	0.56
95% Gamma Approximate UCL	0.926		
95% Adjusted Gamma UCL	0.928		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Chromium

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	97
Number of Distinct Detected Data	68	Number of Non-Detect Data	165
		Percent Non-Detects	62.98%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	96.8	Maximum Detected	4.573
Mean of Detected	2.797	Mean of Detected	-0.416
SD of Detected	12.47	SD of Detected	1.22
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	4	Maximum Non-Detect	1.386

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	256
Number treated as Detected	6
Single DL Non-Detect Percentage	97.71%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.415
Lilliefors Test Statistic	0.415	5% Lilliefors Critical Value	0.09
5% Lilliefors Critical Value	0.09	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.669	Mean	-0.151
SD	7.613	SD	0.769
95% DL/2 (t) UCL	2.445	95% H-Stat (DL/2) UCL	1.268

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.641
		SD in Log Scale	1.043
		Mean in Original Scale	1.451
		SD in Original Scale	7.646
		95% t UCL	2.231
		95% Percentile Bootstrap UCL	2.262
		95% BCA Bootstrap UCL	2.764
		95% H-UCL	1.043

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.441	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6.348		
nu star	85.47		

A-D Test Statistic	12.58	Nonparametric Statistics	
5% A-D Critical Value	0.831	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.831	Mean	1.397
5% K-S Critical Value	0.0968	SD	7.633
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.475
		95% KM (t) UCL	2.181
		95% KM (z) UCL	2.179
		95% KM (jackknife) UCL	2.179
	1.00E-06	95% KM (bootstrap t) UCL	6.54
	96.8	95% KM (BCA) UCL	2.259
	2.305	95% KM (Percentile Bootstrap) UCL	2.304
	0.523	95% KM (Chebyshev) UCL	3.469
	7.861	97.5% KM (Chebyshev) UCL	4.366
	0.163	99% KM (Chebyshev) UCL	6.127
	14.15		
	85.38	Potential UCLs to Use	
	65.08	95% KM (BCA) UCL	2.259
	3.024		
	3.029		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	72
Number of Distinct Detected Data	54	Number of Non-Detect Data	190
		Percent Non-Detects	72.52%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.053	Minimum Detected	-2.937
Maximum Detected	6.6	Maximum Detected	1.887
Mean of Detected	0.558	Mean of Detected	-1.403
SD of Detected	1.072	SD of Detected	1.127
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	2	Maximum Non-Detect	0.693

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	257
Number treated as Detected	5
Single DL Non-Detect Percentage	98.09%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only			
Lilliefors Test Statistic	0.319	Lilliefors Test Statistic	0.11
5% Lilliefors Critical Value	0.104	5% Lilliefors Critical Value	0.104
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.518	Mean	-0.886
SD	0.561	SD	0.67
95% DL/2 (t) UCL	0.575	95% H-Stat (DL/2) UCL	0.558

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.588
		SD in Log Scale	0.97
		Mean in Original Scale	0.353
		SD in Original Scale	0.609
		95% t UCL	0.415
		95% Percentile Bootstrap UCL	0.42
		95% BCA Bootstrap UCL	0.435
		95% H-UCL	0.371

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.712	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.783		
nu star	102.5		

A-D Test Statistic	5.091	Nonparametric Statistics	
5% A-D Critical Value	0.794	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.794	Mean	0.332
5% K-S Critical Value	0.109	SD	0.601
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.043
		95% KM (t) UCL	0.403
		95% KM (z) UCL	0.402
		95% KM (jackknife) UCL	0.403
	1.00E-06	95% KM (bootstrap t) UCL	0.421
	6.6	95% KM (BCA) UCL	0.418
	0.512	95% KM (Percentile Bootstrap) UCL	0.407
	0.277	95% KM (Chebyshev) UCL	0.519
	0.703	97.5% KM (Chebyshev) UCL	0.601
	0.23	99% KM (Chebyshev) UCL	0.76
	2.231		
	120.3	Potential UCLs to Use	
	95.99	95% KM (BCA) UCL	0.418
	0.642		
	0.643		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

ENTIRE AQUIFER

Iron

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	83
Number of Distinct Detected Data	83	Number of Non-Detect Data	179
		Percent Non-Detects	68.32%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	11	Minimum Detected	2.398
Maximum Detected	8520	Maximum Detected	9.05
Mean of Detected	750.6	Mean of Detected	5.307
SD of Detected	1632	SD of Detected	1.601
Minimum Non-Detect	100	Minimum Non-Detect	4.605
Maximum Non-Detect	200	Maximum Non-Detect	5.298

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	222
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	40
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	84.73%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.119
Lilliefors Test Statistic	0.325	5% Lilliefors Critical Value	0.0973
5% Lilliefors Critical Value	0.0973	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	272.1	Mean	4.357
SD	971.2	SD	1.108
95% DL/2 (t) UCL	371.2	95% H-Stat (DL/2) UCL	167.9

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	4.316
		SD in Log Scale	1.447
		Mean in Original Scale	290.2
		SD in Original Scale	968.7
		95% t UCL	389
		95% Percentile Bootstrap UCL	396.3
		95% BCA Bootstrap UCL	435.5
		95% H-UCL	267.8

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.476	Data do not follow a Discernable Distribution (0.05)	
Theta Star	1576		
nu star	79.05		

A-D Test Statistic	3.833	Nonparametric Statistics	
5% A-D Critical Value	0.822	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.822	Mean	274.7
5% K-S Critical Value	0.104	SD	968.9
Data not Gamma Distributed at 5% Significance Level		SE of Mean	60.3

Assuming Gamma Distribution		95% KM (t) UCL	374.2
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	373.9
Minimum	1.00E-06	95% KM (jackknife) UCL	373.8
Maximum	8520	95% KM (bootstrap t) UCL	435.6
Mean	355.7	95% KM (BCA) UCL	387.1
Median	51.14	95% KM (Percentile Bootstrap) UCL	383.8
SD	981.3	95% KM (Chebyshev) UCL	537.5
k star	0.0977	97.5% KM (Chebyshev) UCL	651.3
Theta star	3640	99% KM (Chebyshev) UCL	874.7
Nu star	51.2	Potential UCLs to Use	
AppChi2	35.76	95% KM (Chebyshev) UCL	537.5
95% Gamma Approximate UCL	509.1		
95% Adjusted Gamma UCL	510.2		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	245
Number of Distinct Detected Data	225	Number of Non-Detect Data	17
		Percent Non-Detects	6.49%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	2020	Maximum Detected	7.611
Mean of Detected	205.6	Mean of Detected	3.866
SD of Detected	334.7	SD of Detected	2.063
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.27	Lilliefors Test Statistic	0.0646
5% Lilliefors Critical Value	0.0566	5% Lilliefors Critical Value	0.0566
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	192.3	Mean	3.57
SD	327.5	SD	2.291
95% DL/2 (t) UCL	225.7	95% H-Stat (DL/2) UCL	798

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	167.8	Mean in Log Scale	3.601
SD	353.4	SD in Log Scale	2.244
95% MLE (t) UCL	203.9	Mean in Original Scale	192.3
95% MLE (Tiku) UCL	201.7	SD in Original Scale	327.5
		95% t UCL	225.7
		95% Percentile Bootstrap UCL	226.3
		95% BCA Bootstrap UCL	228.2
		95% H UCL	728.5

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.441	Data do not follow a Discernable Distribution (0.05)	
Theta Star	466.5		
nu star	215.9		

A-D Test Statistic	2.183	Nonparametric Statistics	
5% A-D Critical Value	0.835	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.835	Mean	192.3
5% K-S Critical Value	0.0623	SD	326.9
Data not Gamma Distributed at 5% Significance Level		SE of Mean	20.24
		95% KM (t) UCL	225.7
		95% KM (z) UCL	225.6
		95% KM (jackknife) UCL	225.7
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	230.3
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	226.5
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL	225.8
Maximum	2020	95% KM (Chebyshev) UCL	280.5
Mean	192.3	97.5% KM (Chebyshev) UCL	318.7
Median	50.2	99% KM (Chebyshev) UCL	393.7
SD	327.6		
k star	0.275	Potential UCLs to Use	
Theta star	699.8	97.5% KM (Chebyshev) UCL	318.7
Nu star	143.9		
AppChi2	117.2		
95% Gamma Approximate UCL	236.1		
95% Adjusted Gamma UCL	236.4		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics - Data are in µg/L.

Number of Valid Data	262	Number of Detected Data	216
Number of Distinct Detected Data	111	Number of Non-Detect Data	46
		Percent Non-Detects	17.56%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.3	Minimum Detected	0.262
Maximum Detected	30.1	Maximum Detected	3.405
Mean of Detected	7.848	Mean of Detected	1.921
SD of Detected	4.065	SD of Detected	0.559
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	10	Maximum Non-Detect	2.303

Note: Data have multiple DLs - Use of KM Method is recommended
 For all methods (except KM, DL/2, and ROS Methods),
 Observations < Largest ND are treated as NDs

Number treated as Non-Detect	205
Number treated as Detected	57
Single DL Non-Detect Percentage	78.24%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Lilliefors Test Statistic	0.0789
Lilliefors Test Statistic	0.0836	5% Lilliefors Critical Value	0.0603
5% Lilliefors Critical Value	0.0603	Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.901	Mean	1.729
SD	4.23	SD	0.687
95% DL/2 (t) UCL	7.333	95% H-Stat (DL/2) UCL	7.737

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	5.174	Mean in Log Scale	1.779
SD	5.97	SD in Log Scale	0.612
95% MLE (t) UCL	5.782	Mean in Original Scale	7.037
95% MLE (Tiku) UCL	6.557	SD in Original Scale	4.109
		95% t UCL	7.456
		95% Percentile Bootstrap UCL	7.462
		95% BCA Bootstrap UCL	7.453
		95% H UCL	7.666

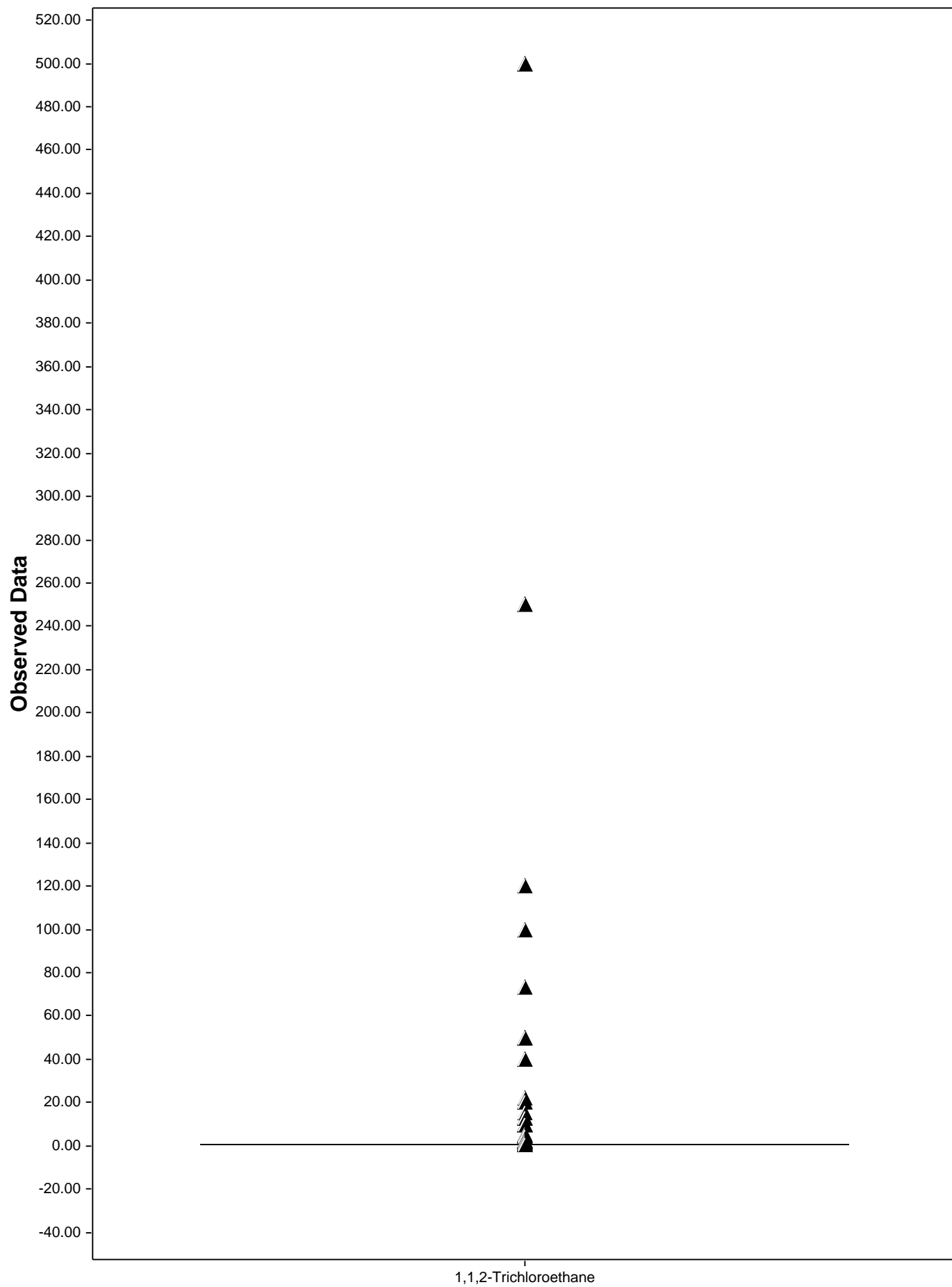
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	3.695	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	2.124		
nu star	1596		

A-D Test Statistic	0.592	Nonparametric Statistics	
5% A-D Critical Value	0.758	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.758	Mean	7.021
5% K-S Critical Value	0.0621	SD	4.128
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.259
		95% KM (t) UCL	7.448
		95% KM (z) UCL	7.446
		95% KM (jackknife) UCL	7.447
	1.00E-06	95% KM (bootstrap t) UCL	7.469
	30.1	95% KM (BCA) UCL	7.429
	6.941	95% KM (Percentile Bootstrap) UCL	7.466
	6.25	95% KM (Chebyshev) UCL	8.148
	4.276	97.5% KM (Chebyshev) UCL	8.636
	0.746	99% KM (Chebyshev) UCL	9.594
	9.307		
	390.8	Potential UCLs to Use	
	346	95% KM (BCA) UCL	7.429
	7.84		
	7.845		

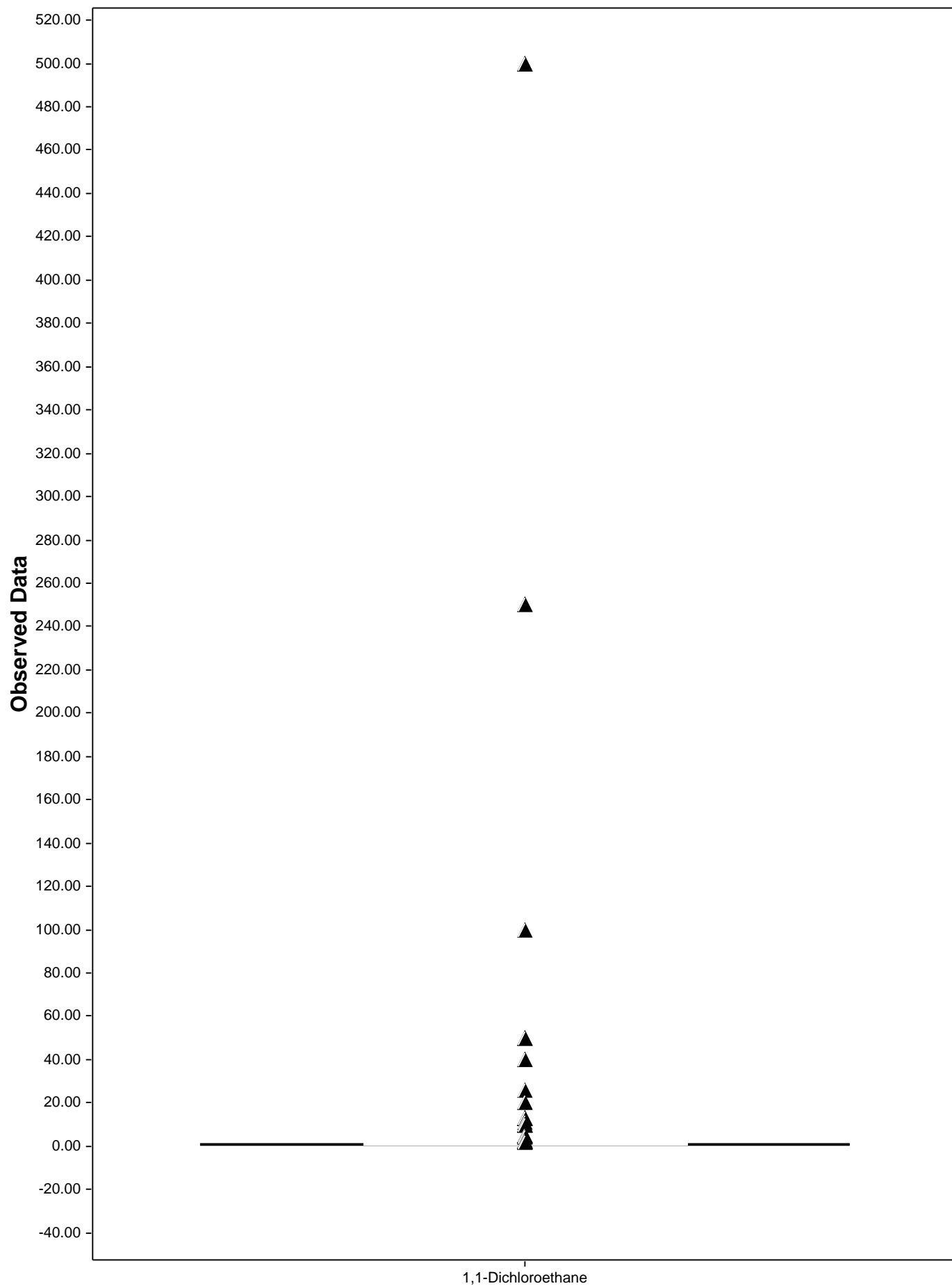
Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

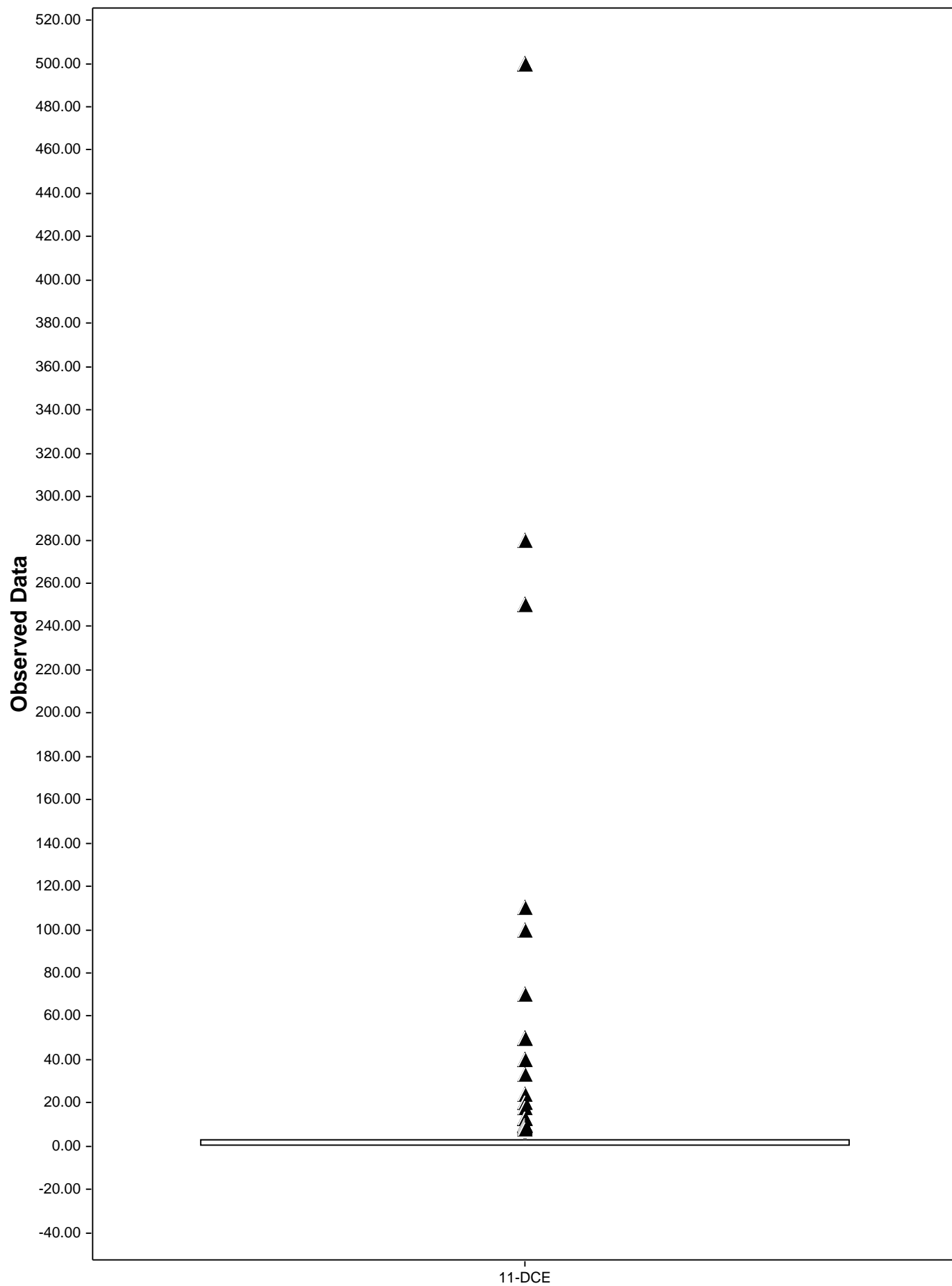
Box Plot for 1,1,2-Trichloroethane



Box Plot for 1,1-Dichloroethane



Box Plot for 11-DCE



[illegible]

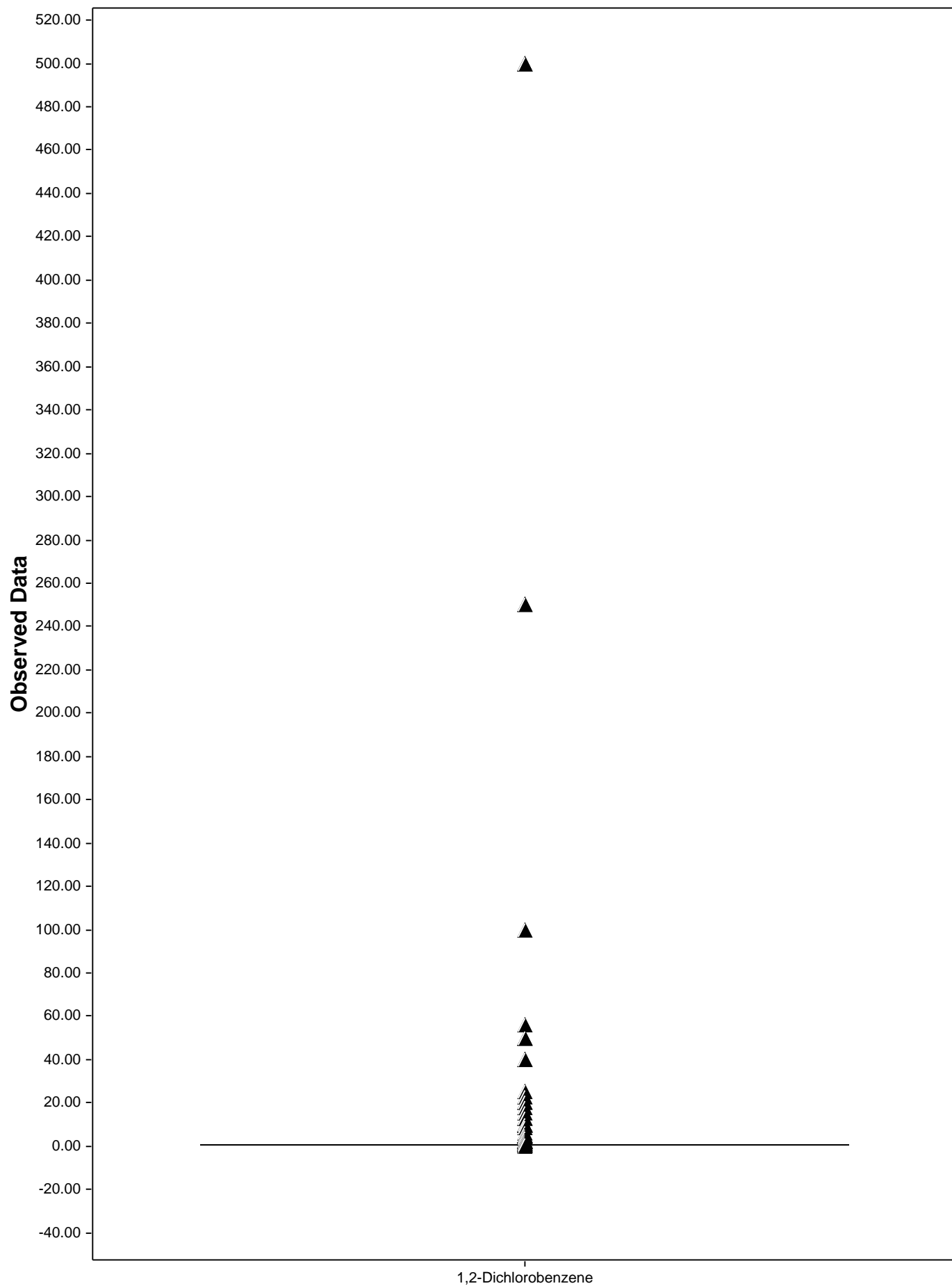
1,2,3-Trichlorobenzene

A box plot titled "Box Plot for 1,2,4-Trichlorobenzene". The y-axis is labeled "Observed Data" and ranges from -100.00 to 1600.00 with major ticks every 100.00 units. The x-axis is labeled "1,2,4-Trichlorobenzene". The plot shows a distribution of data points represented by black upward-pointing triangles. Most points are clustered near zero, with one significant outlier at approximately 1600.00.

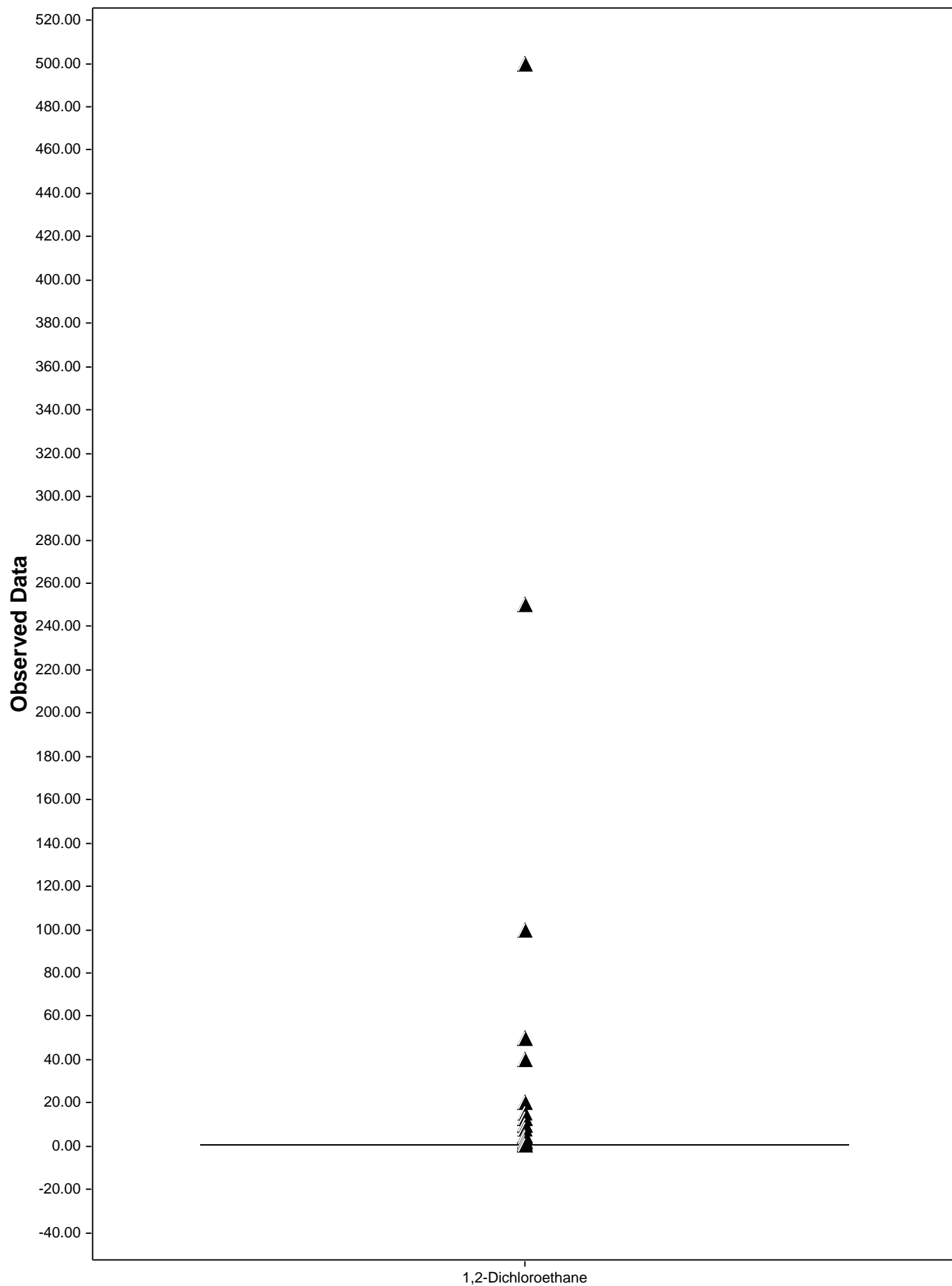
Observed Data
-10
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
250
320
350
360
500
1600

1,2,4-Trichlorobenzene

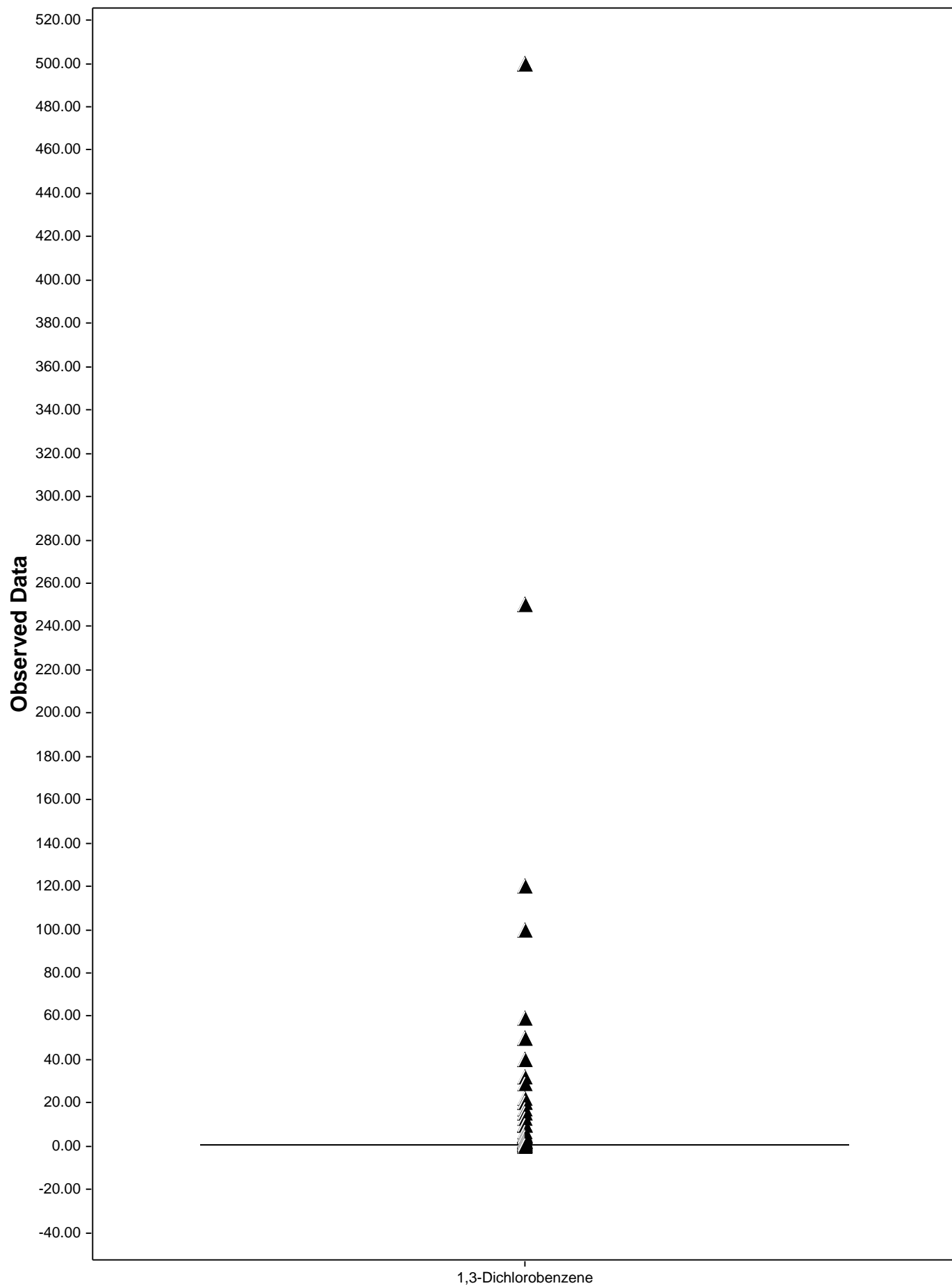
Box Plot for 1,2-Dichlorobenzene



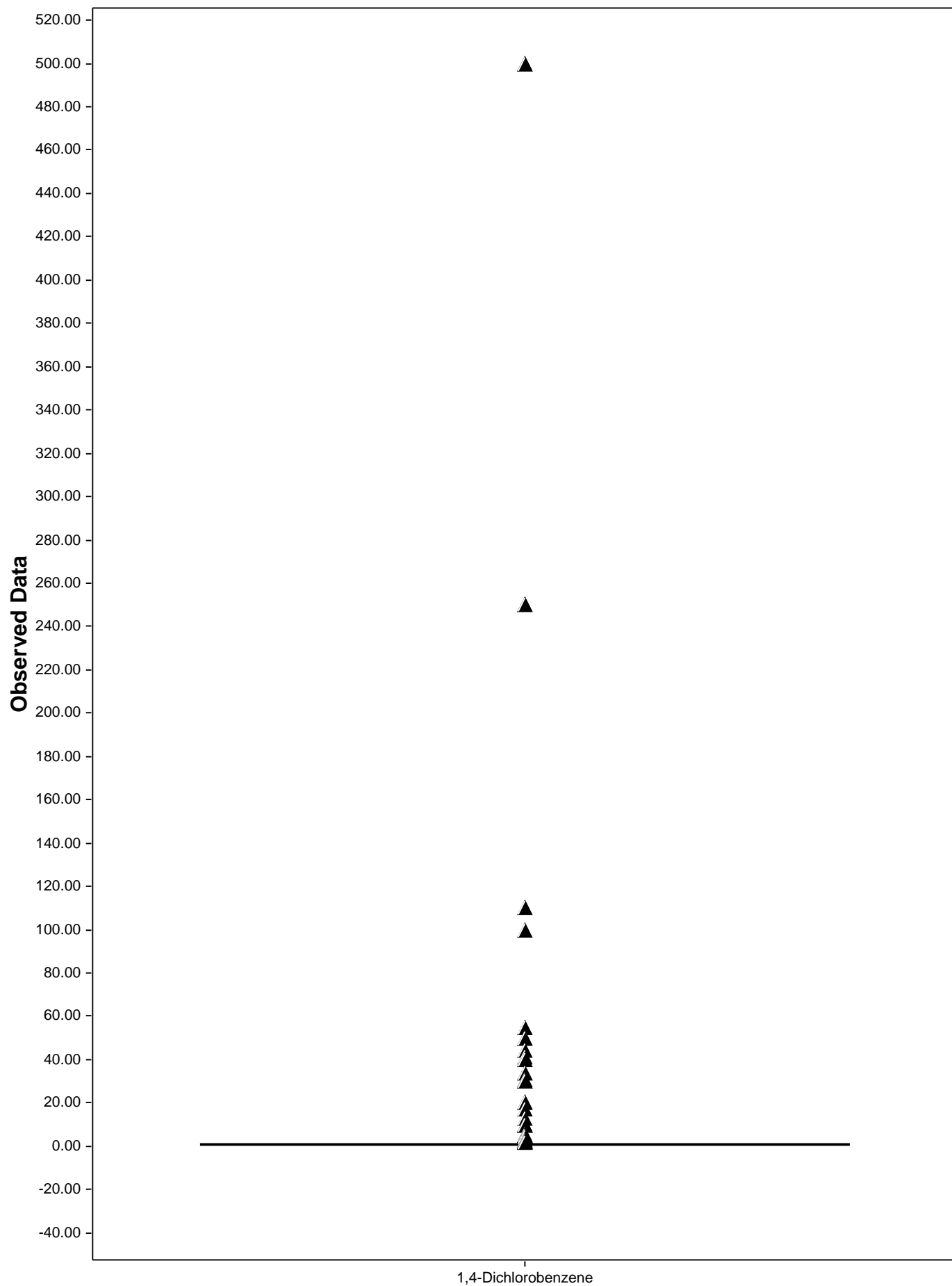
Box Plot for 1,2-Dichloroethane



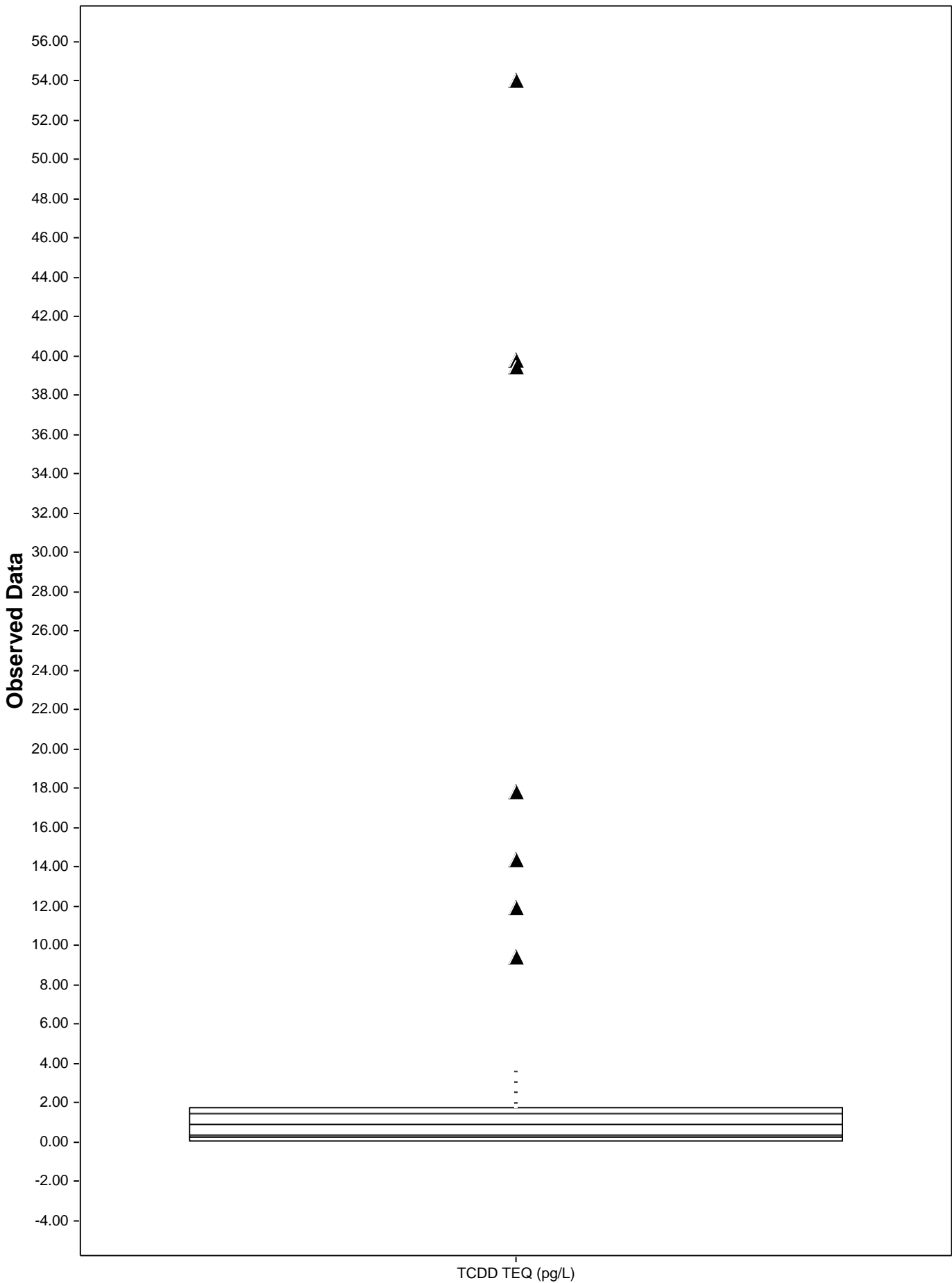
Box Plot for 1,3-Dichlorobenzene



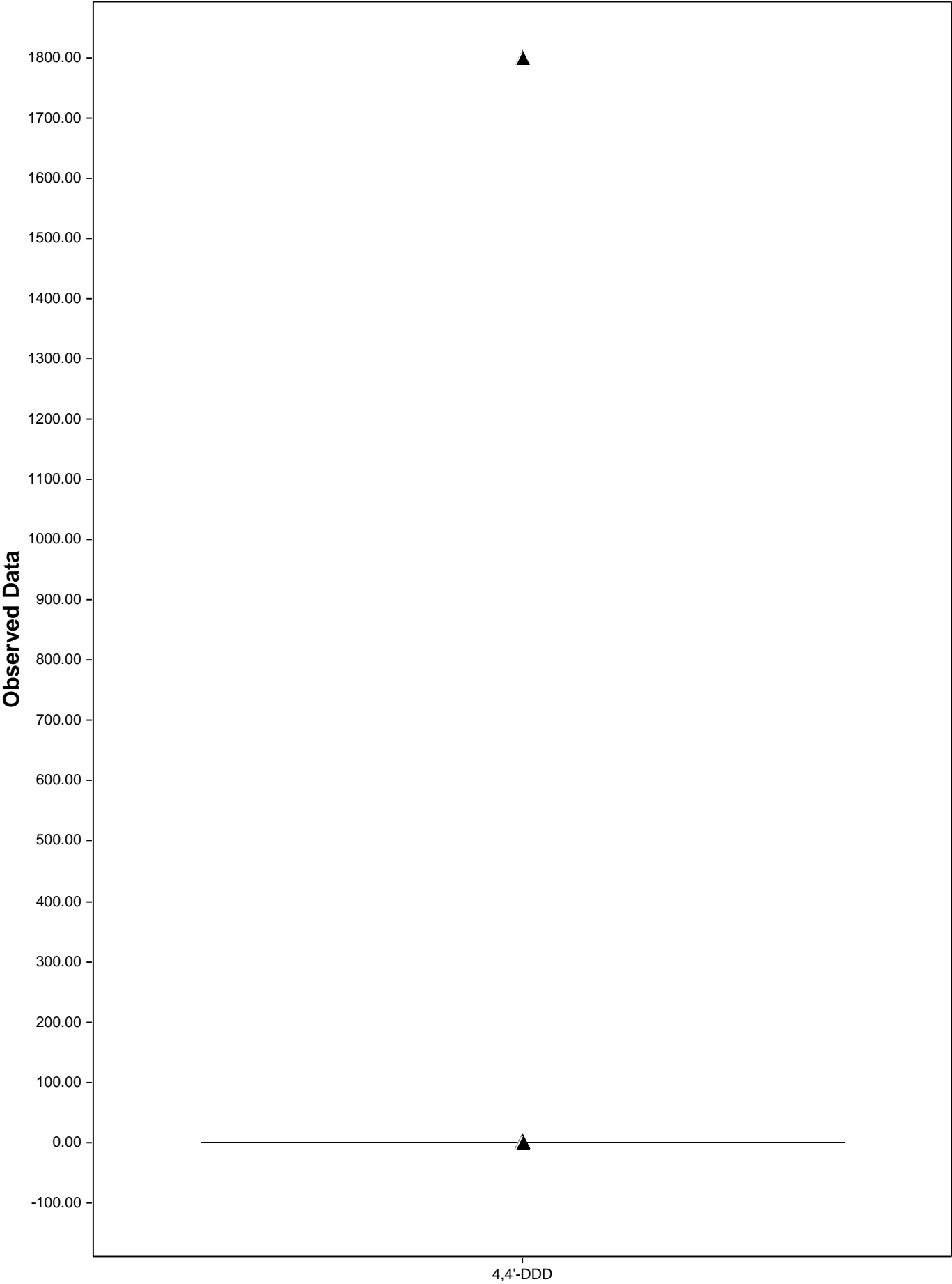
Box Plot for 1,4-Dichlorobenzene



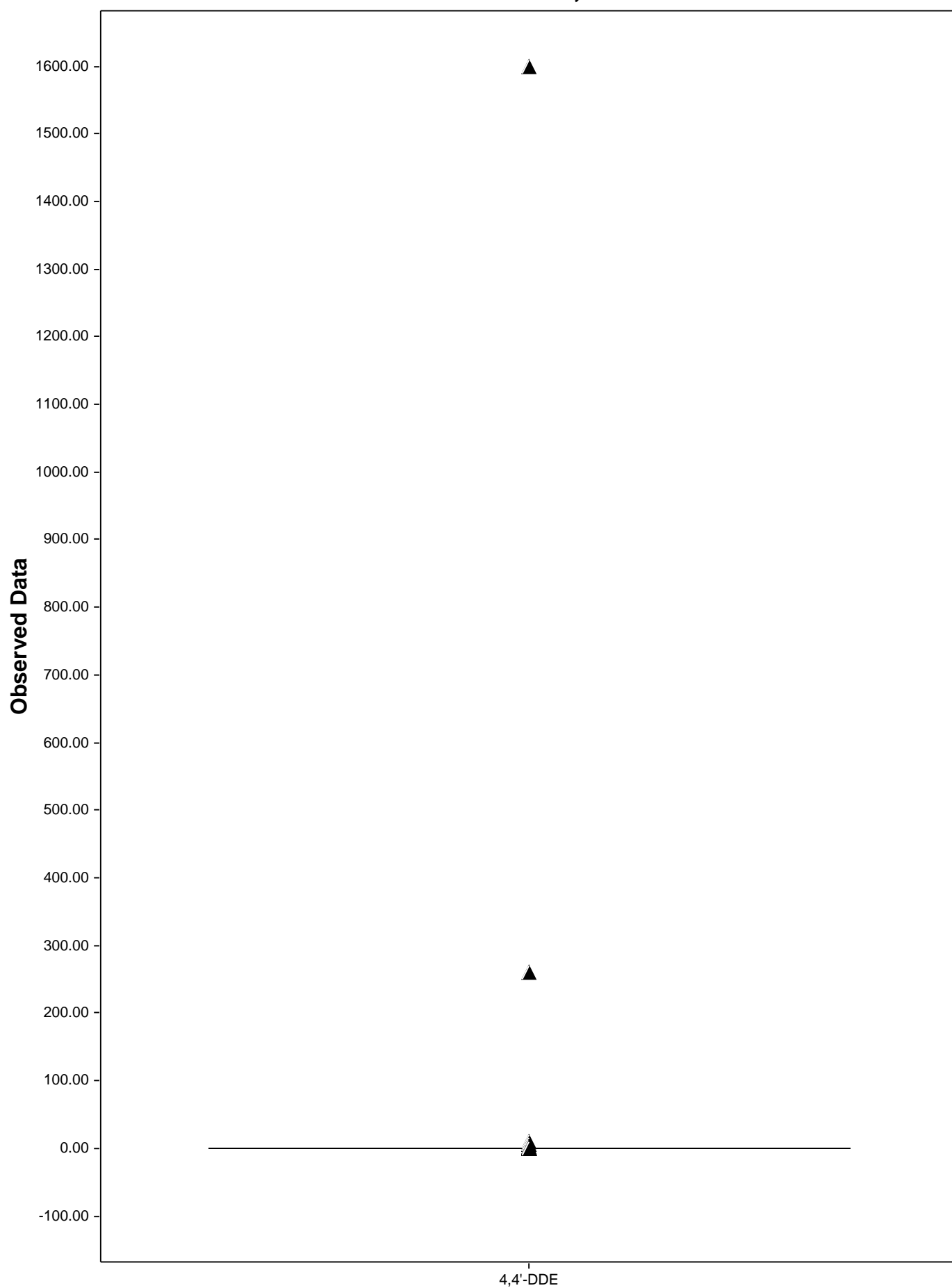
Box Plot for TCDD TEQ (pg/L)



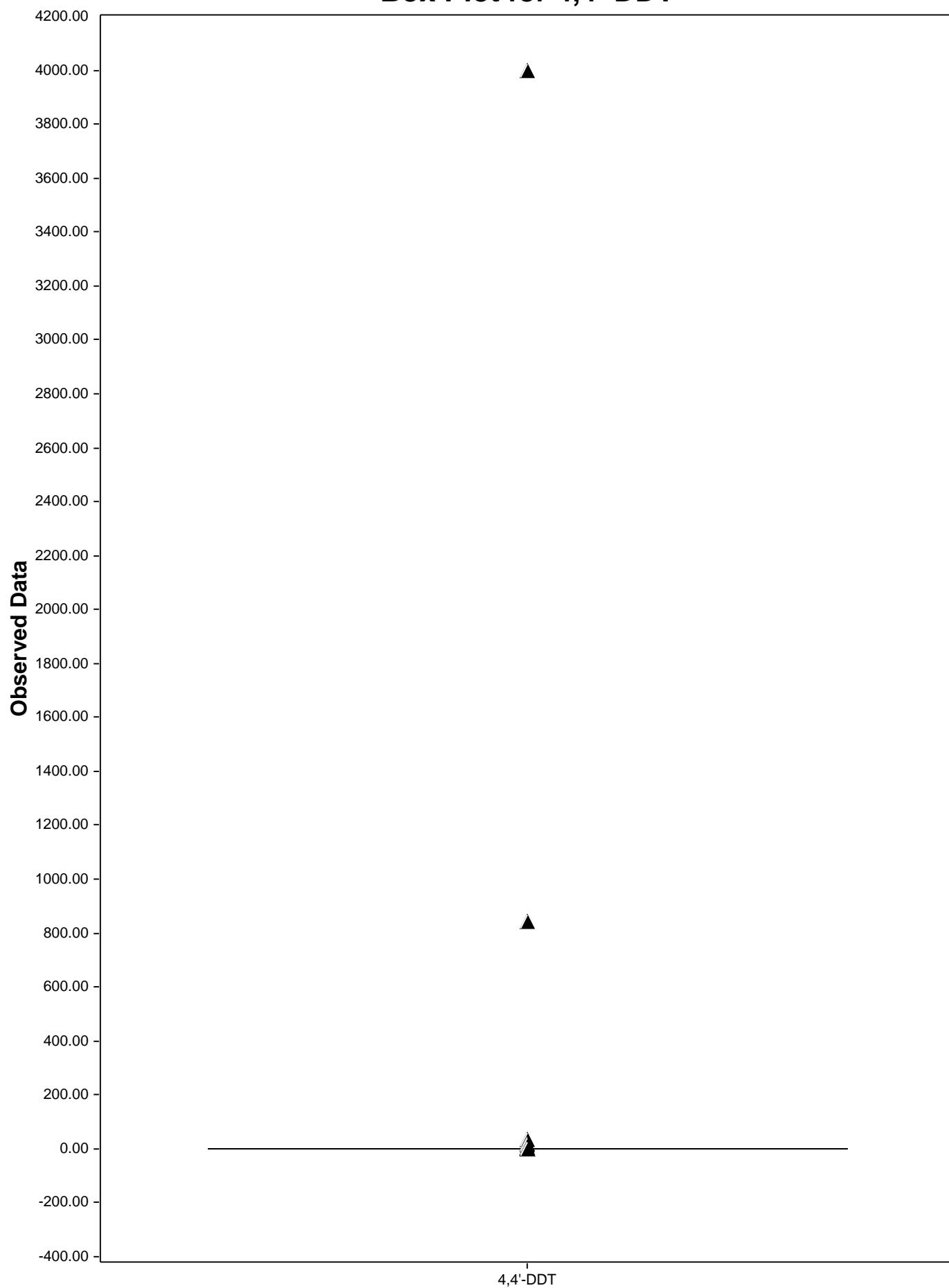
Box Plot for 4,4'-DDD



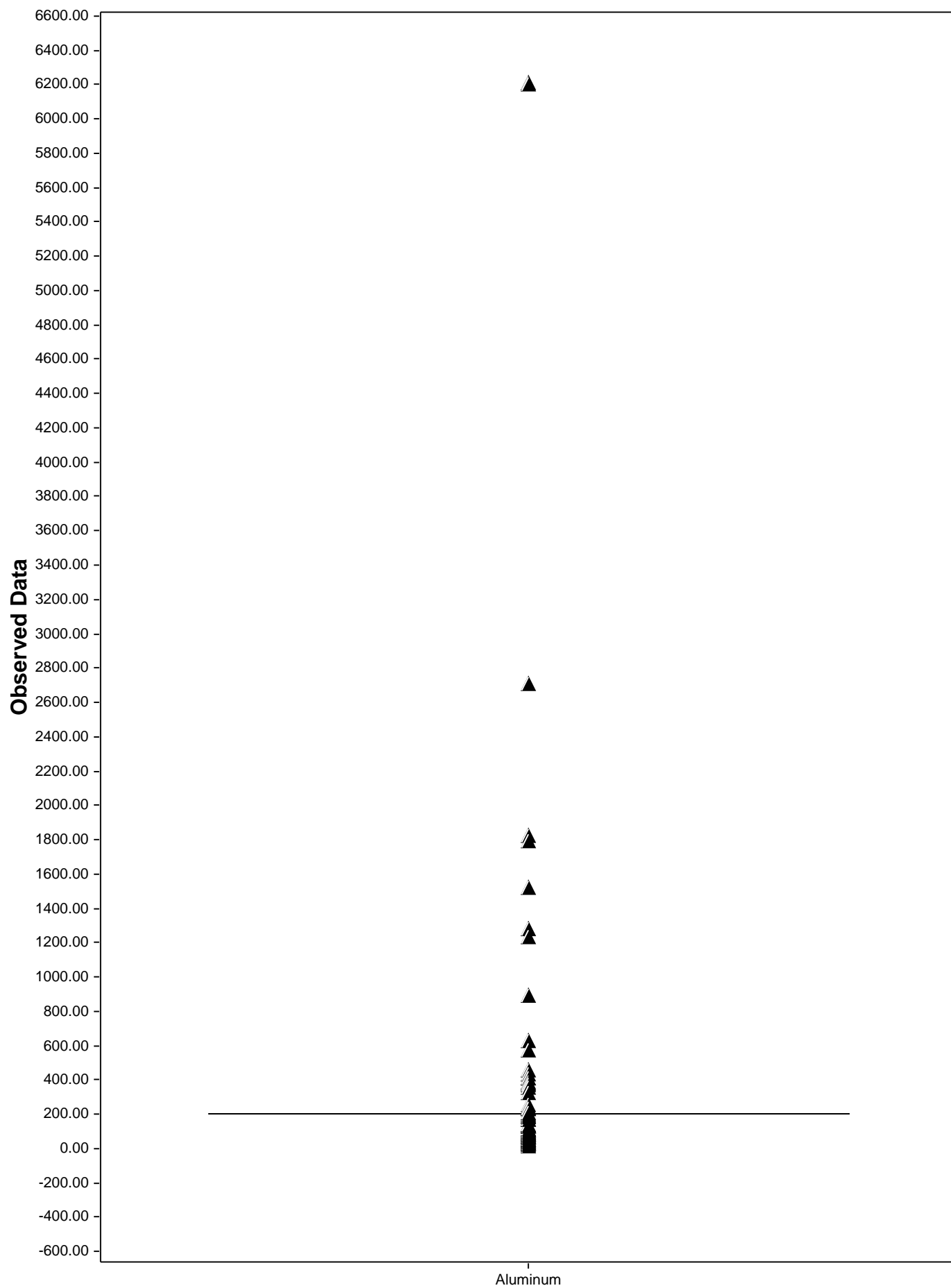
Box Plot for 4,4'-DDE



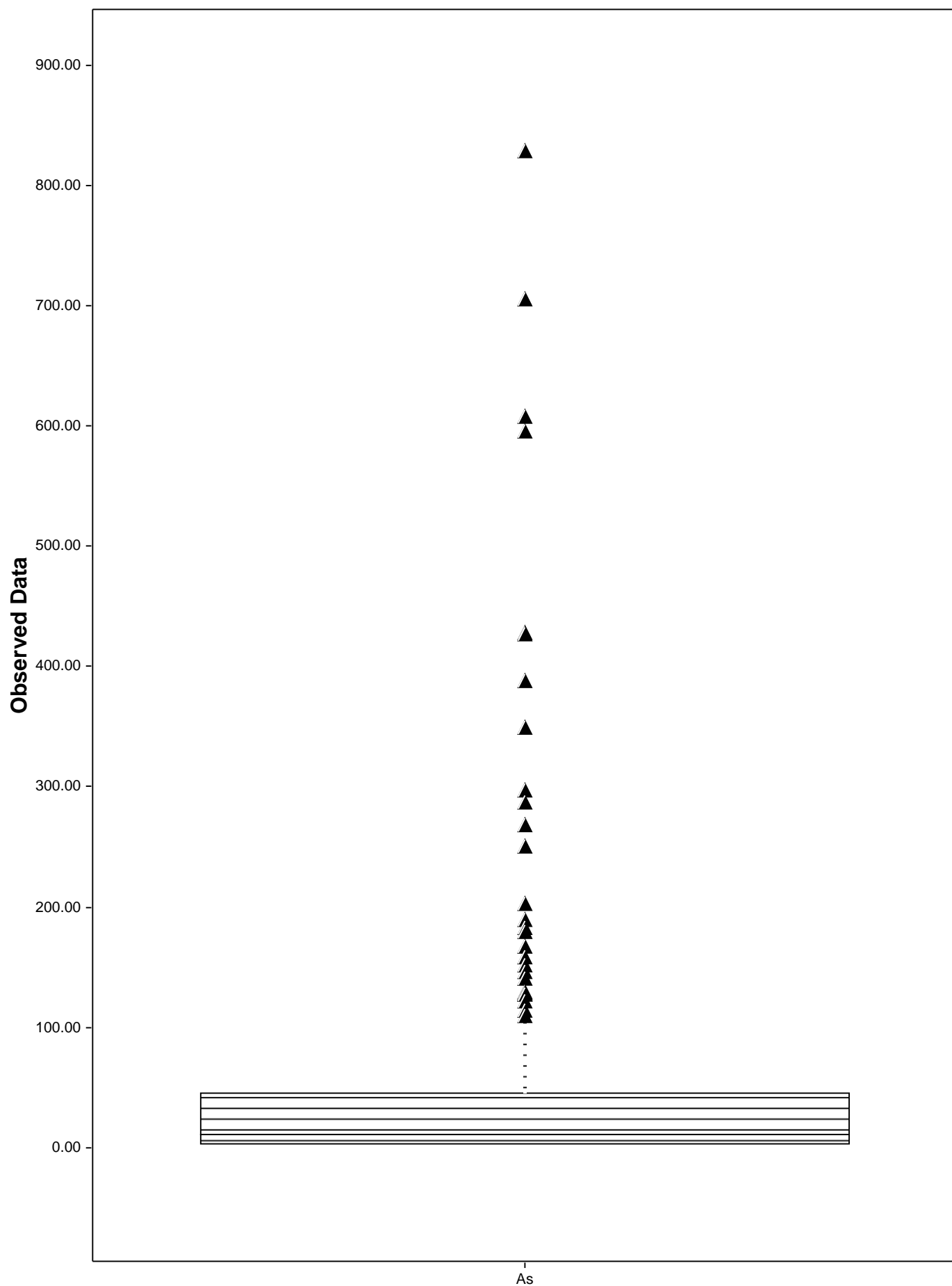
Box Plot for 4,4'-DDT



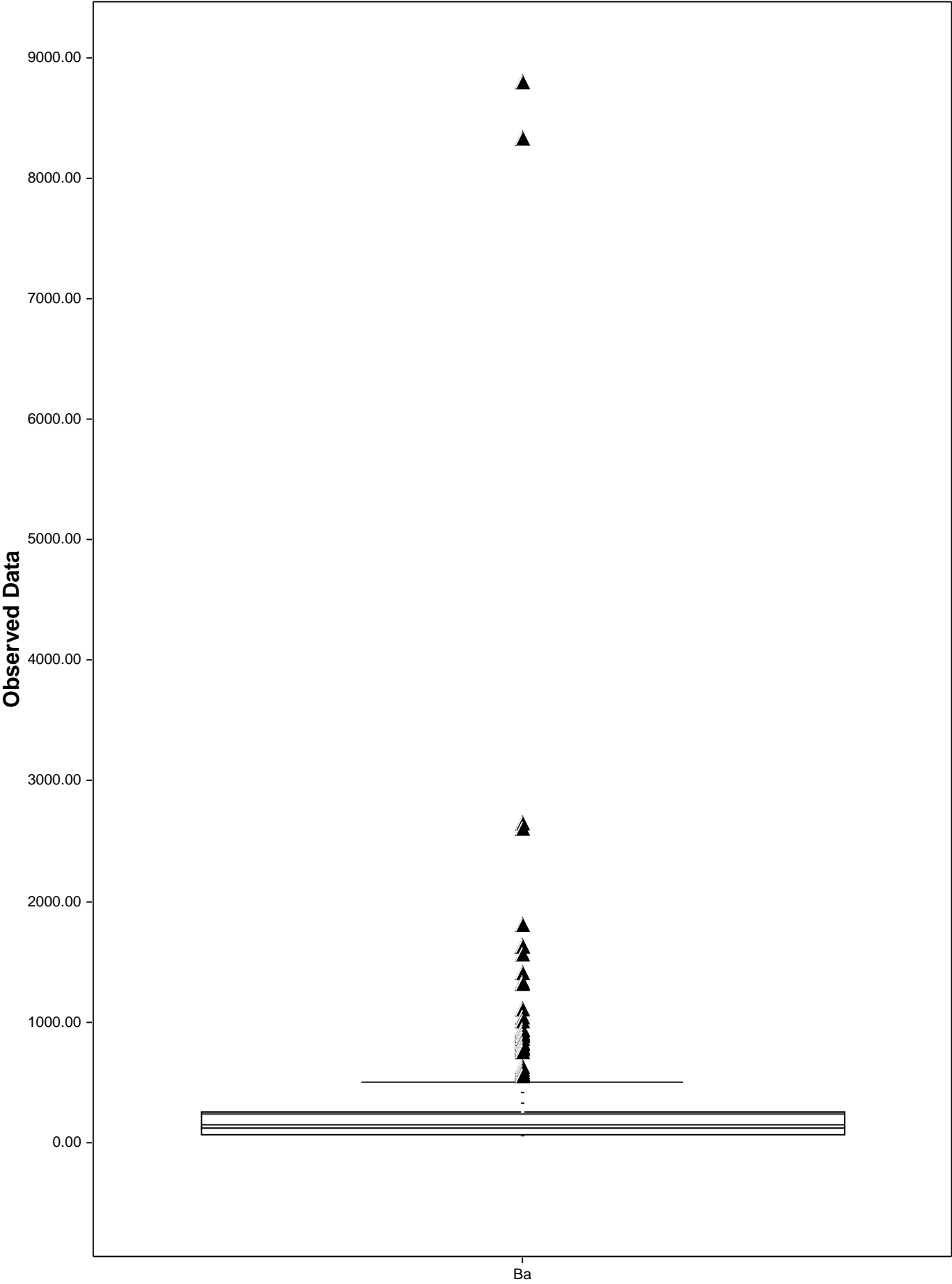
Box Plot for Aluminum



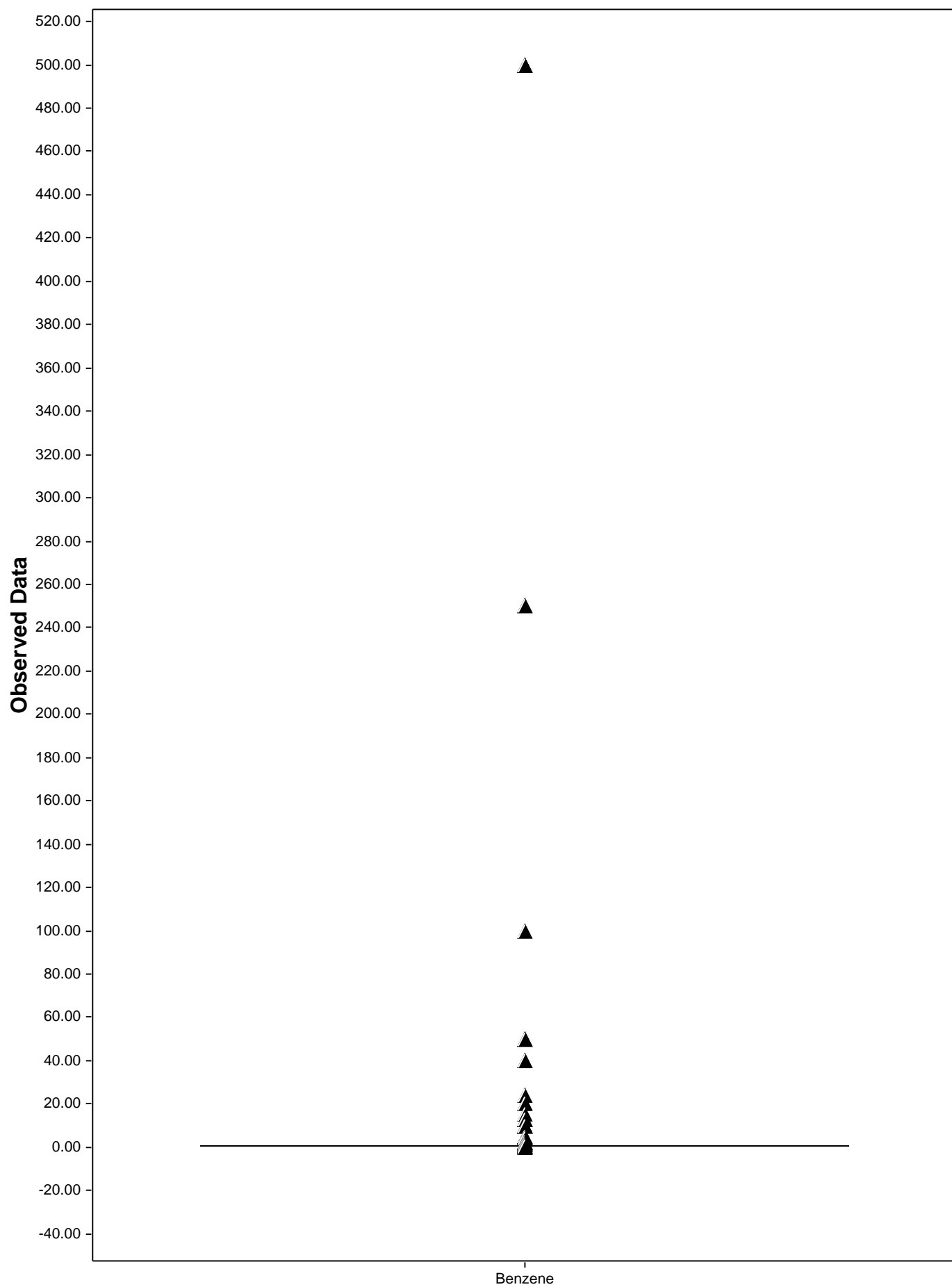
Box Plot for As



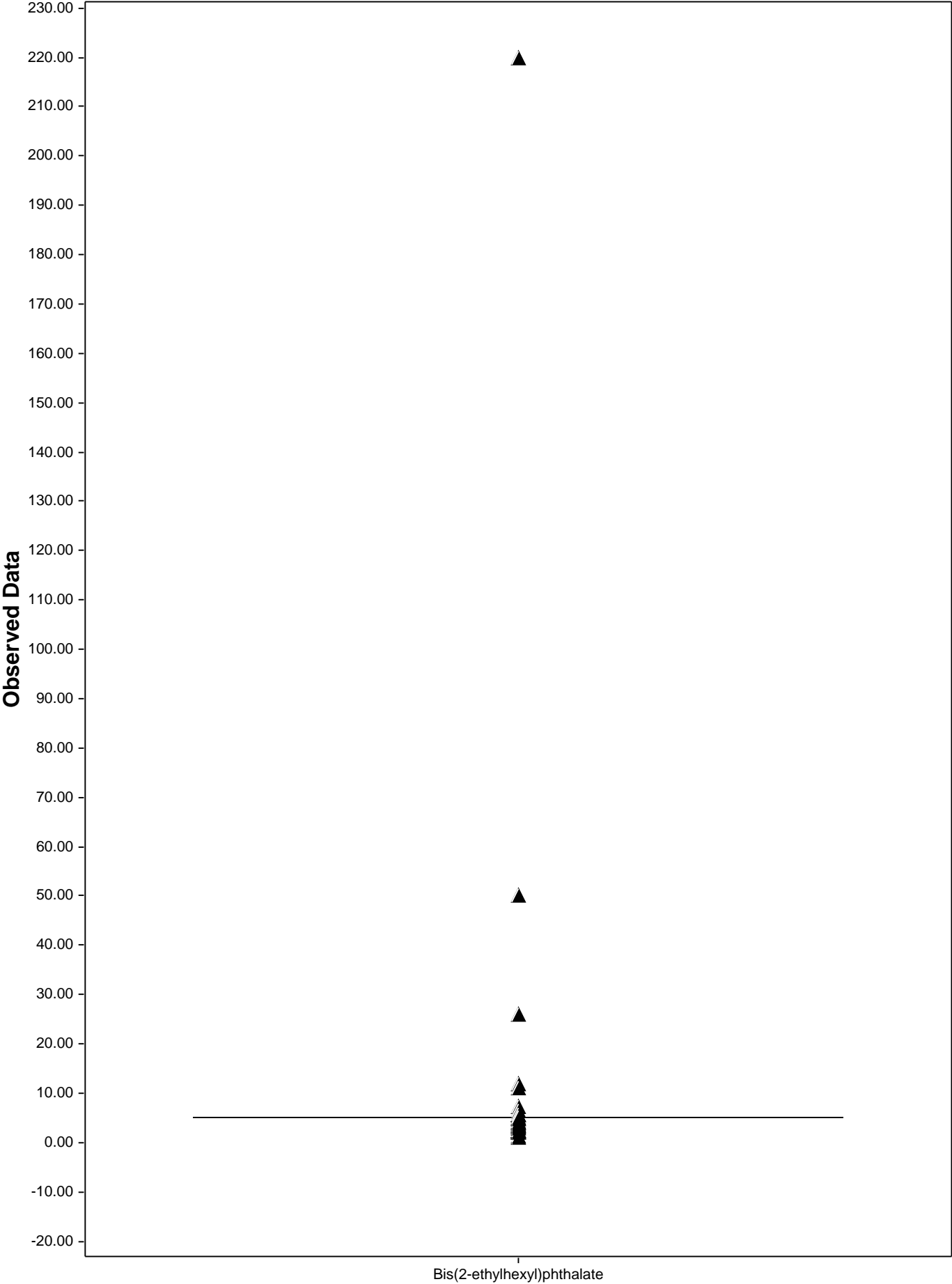
Box Plot for Ba



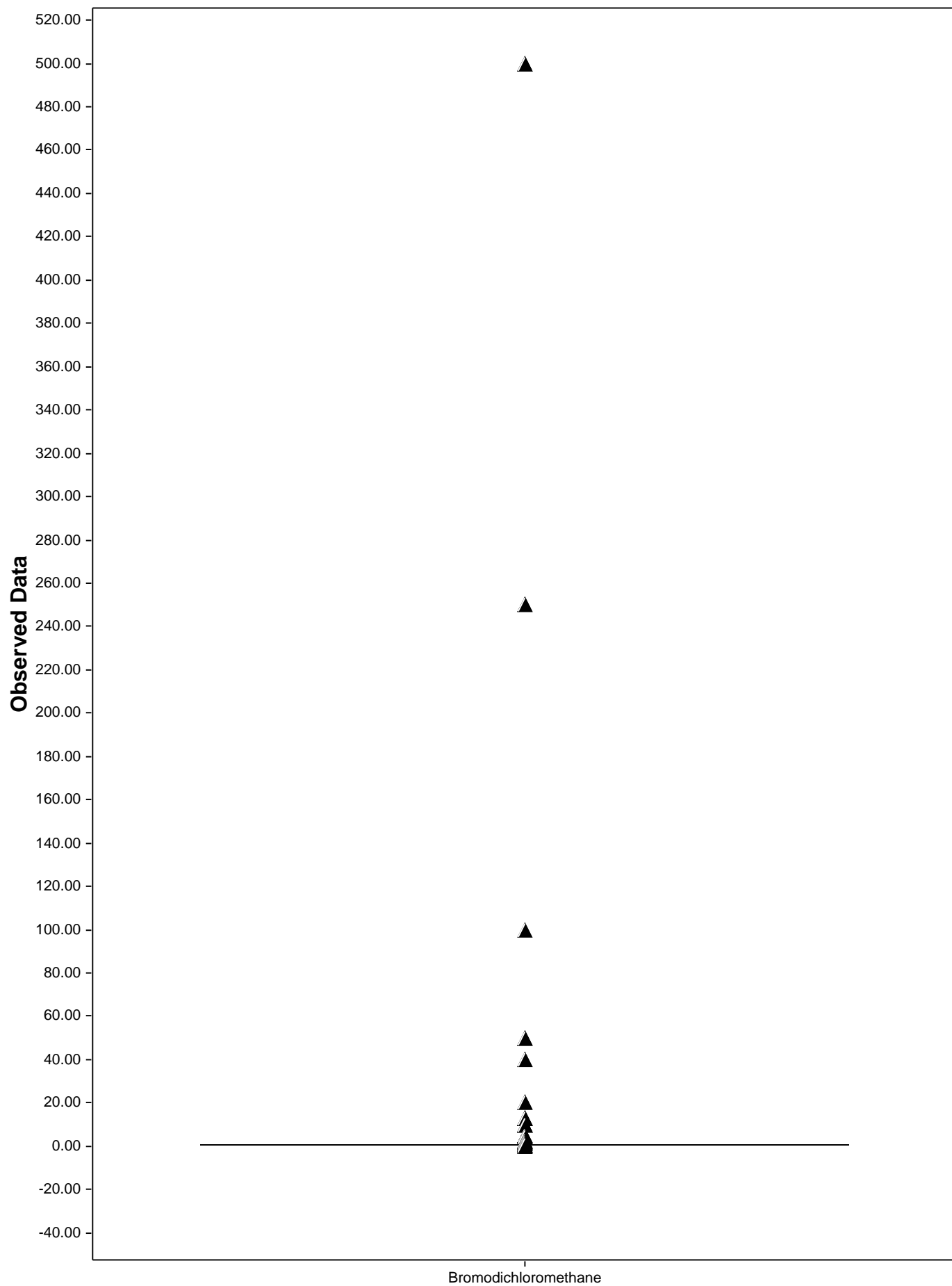
Box Plot for Benzene



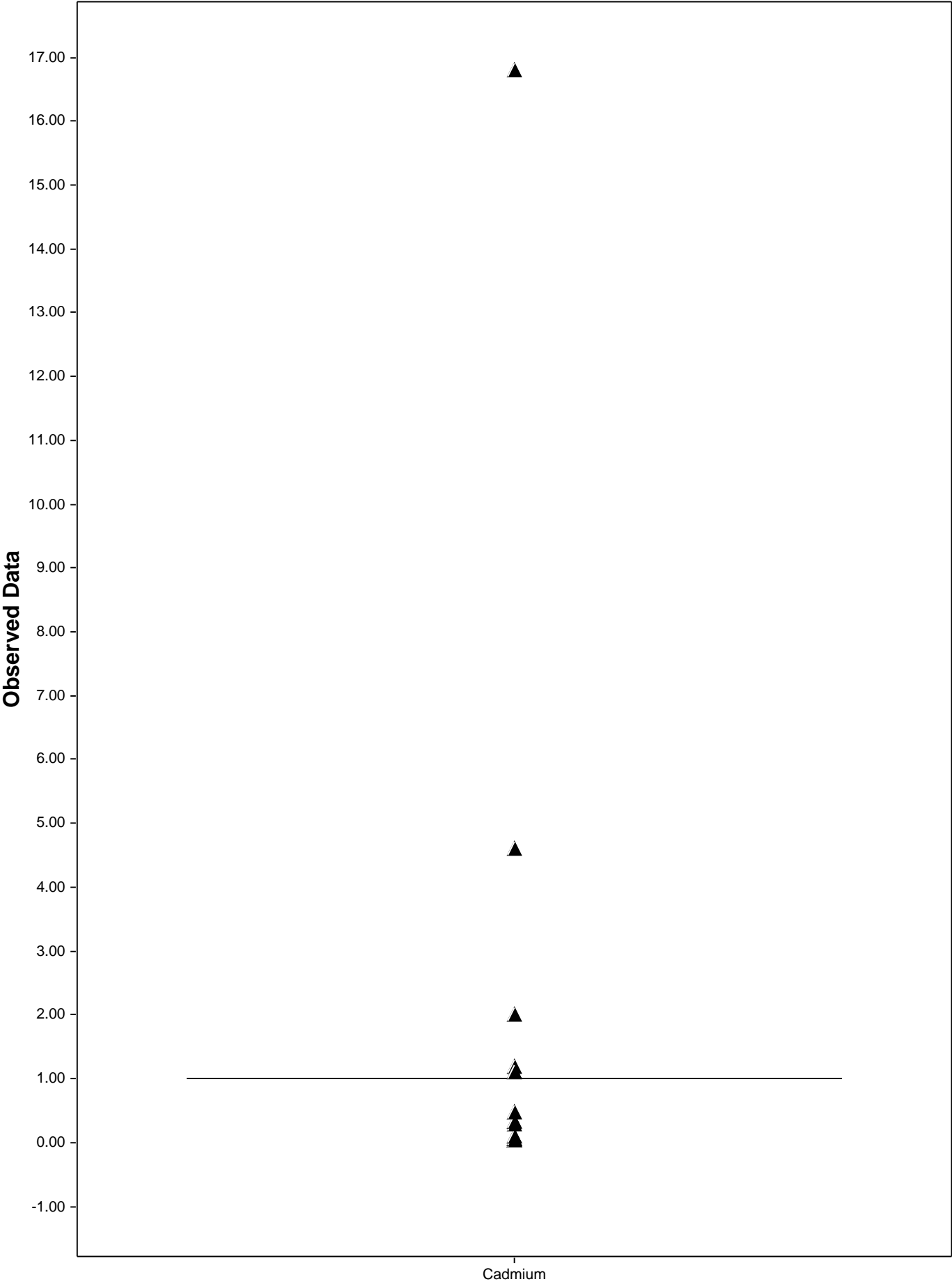
Box Plot for Bis(2-ethylhexyl)phthalate



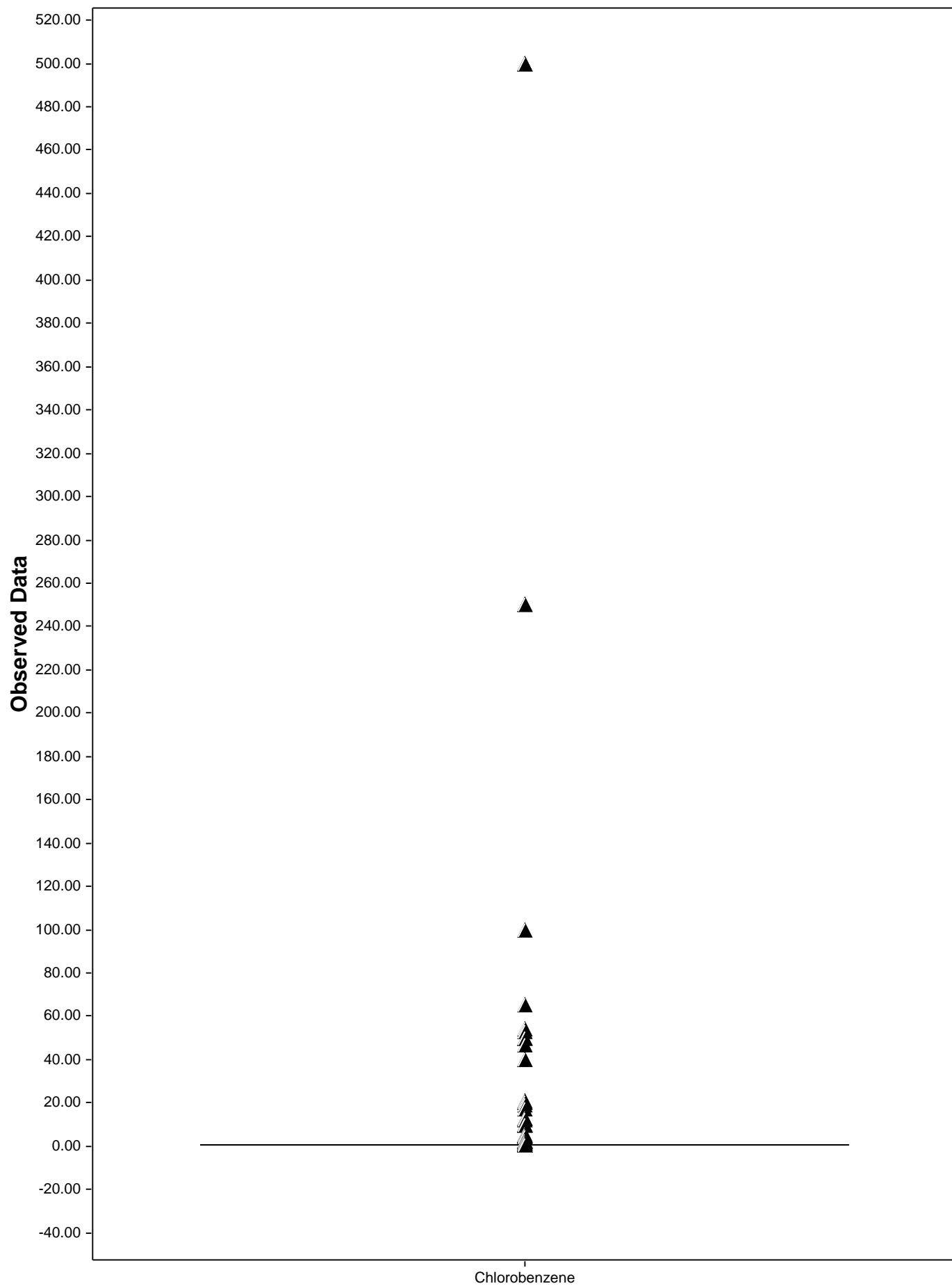
Box Plot for Bromodichloromethane



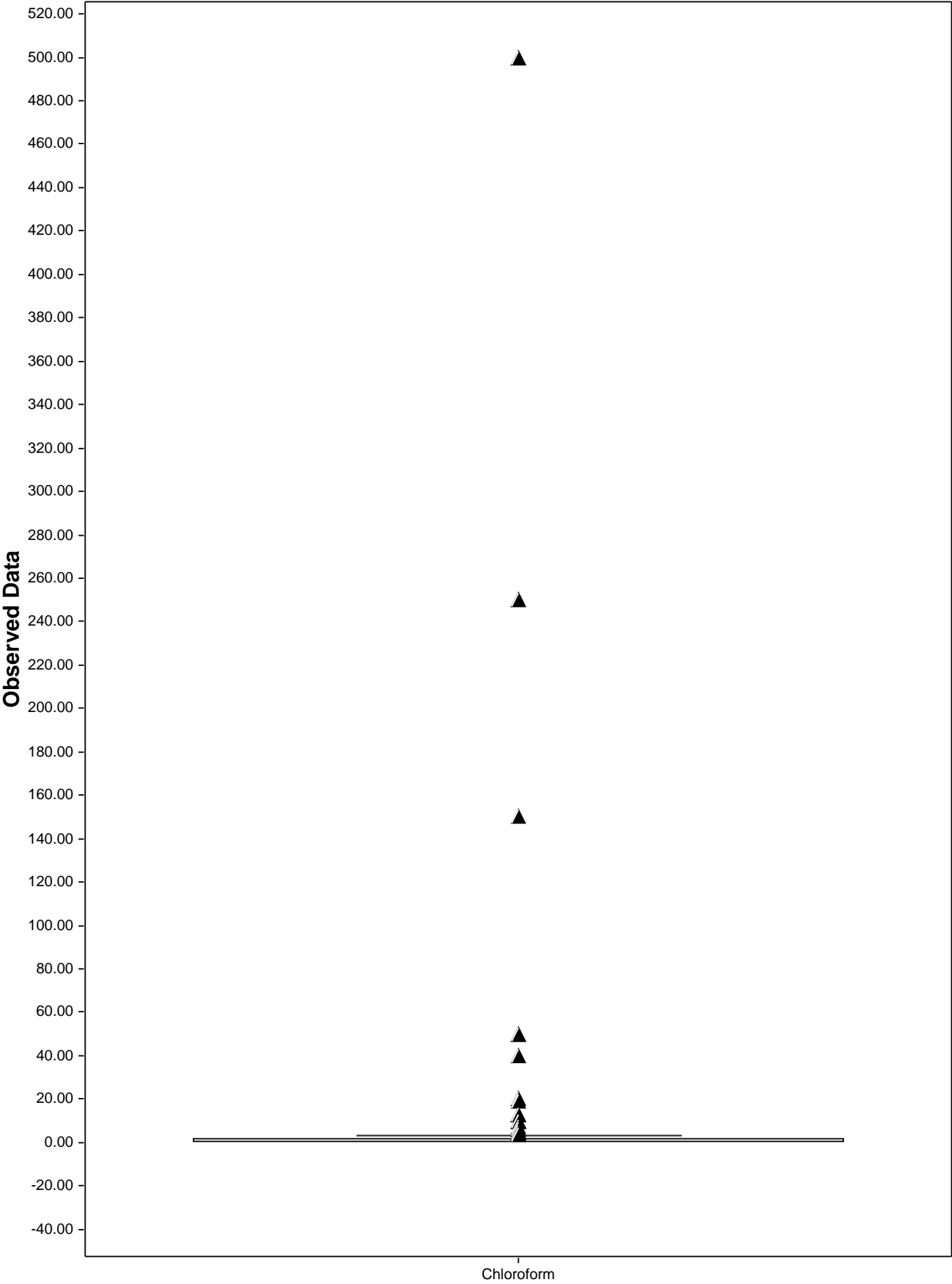
Box Plot for Cadmium



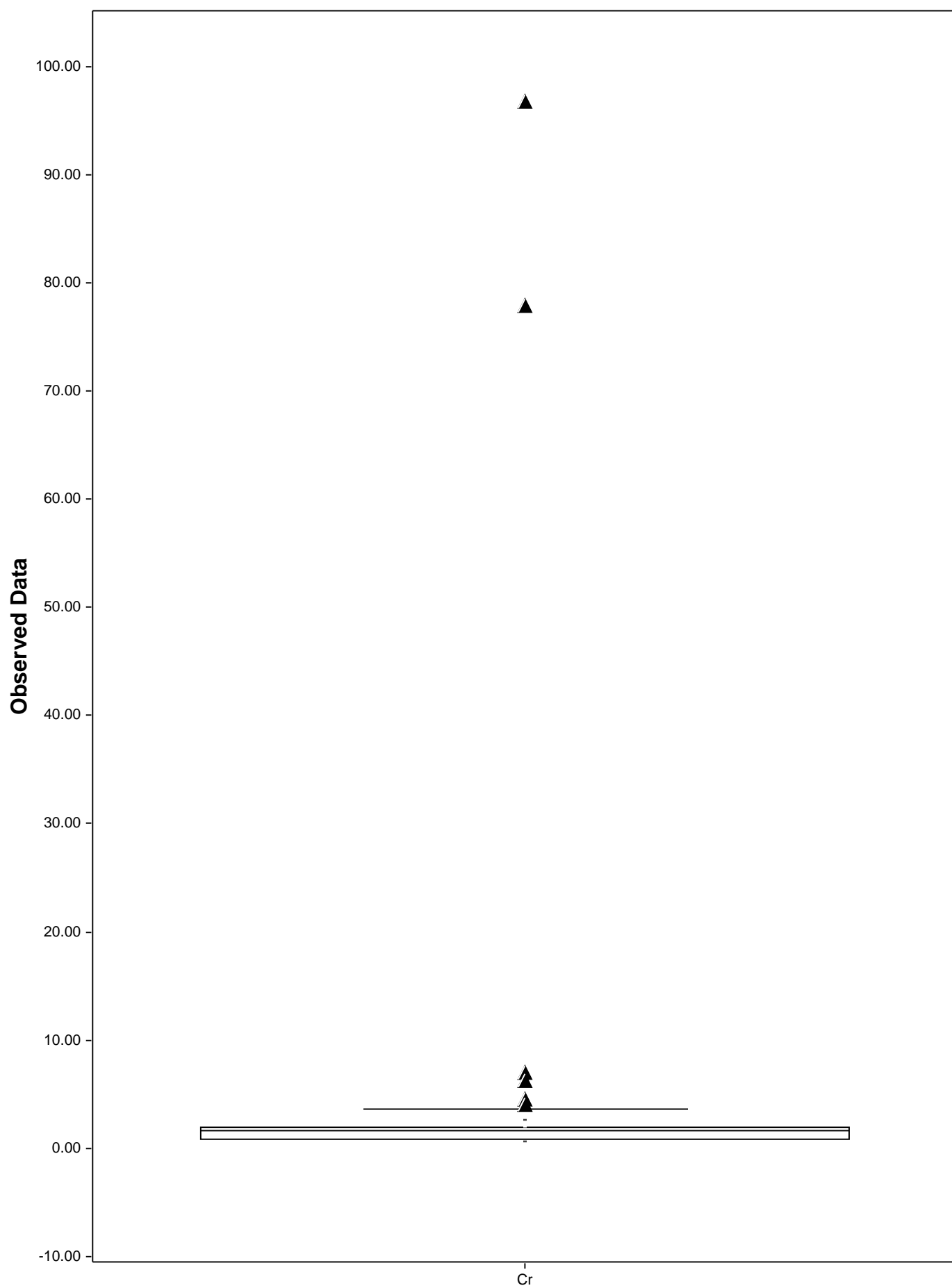
Box Plot for Chlorobenzene



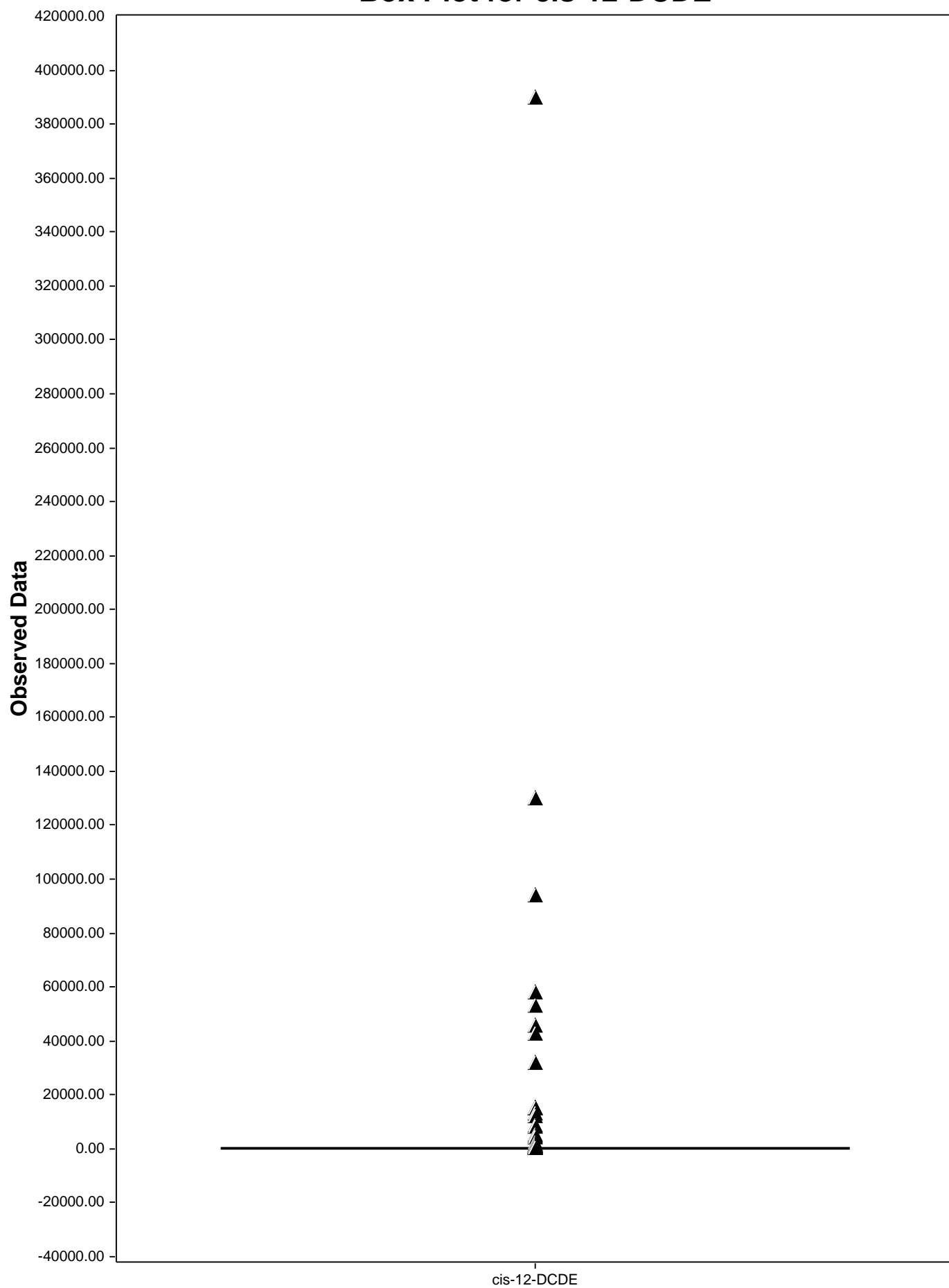
Box Plot for Chloroform



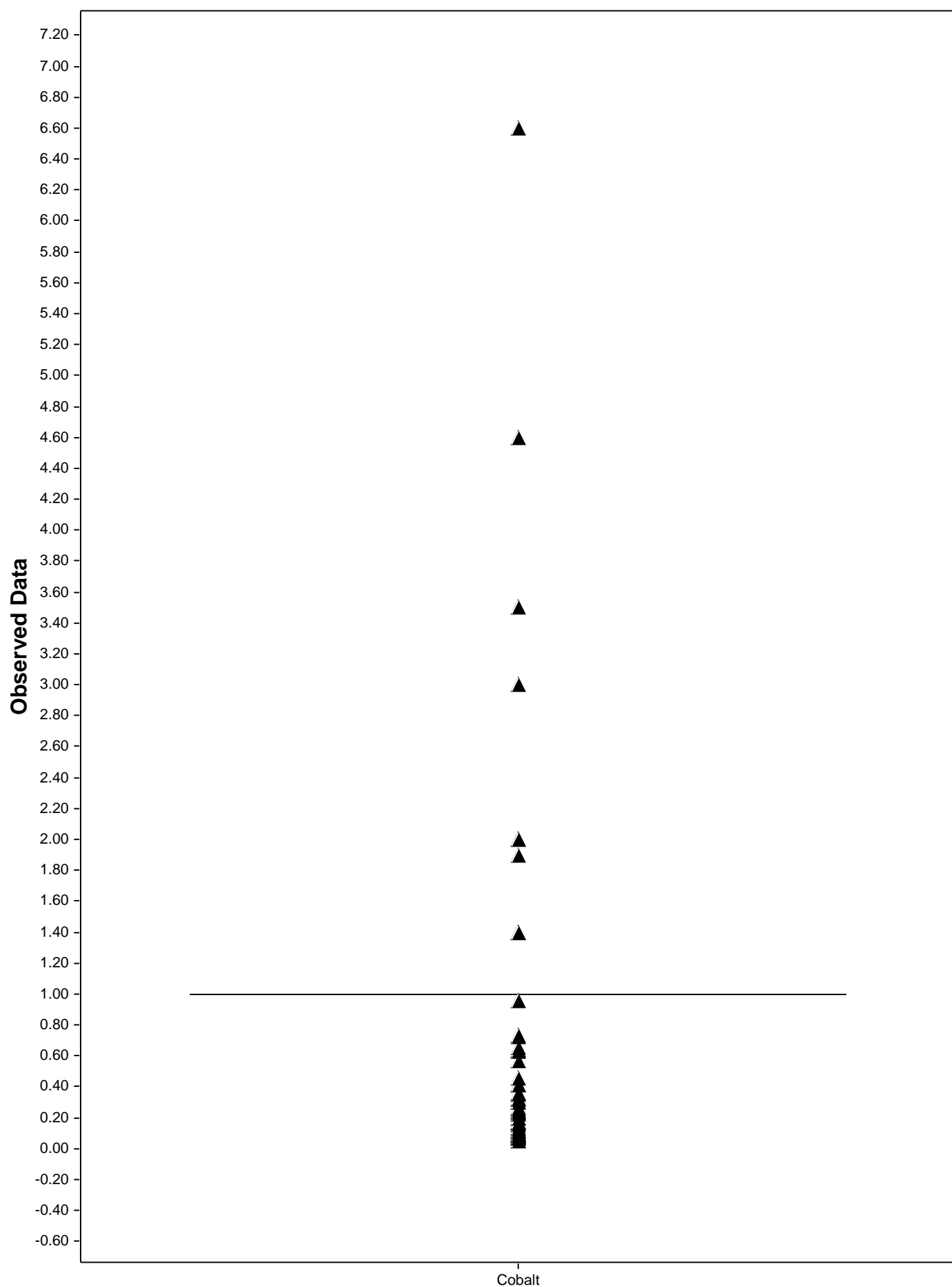
Box Plot for Cr



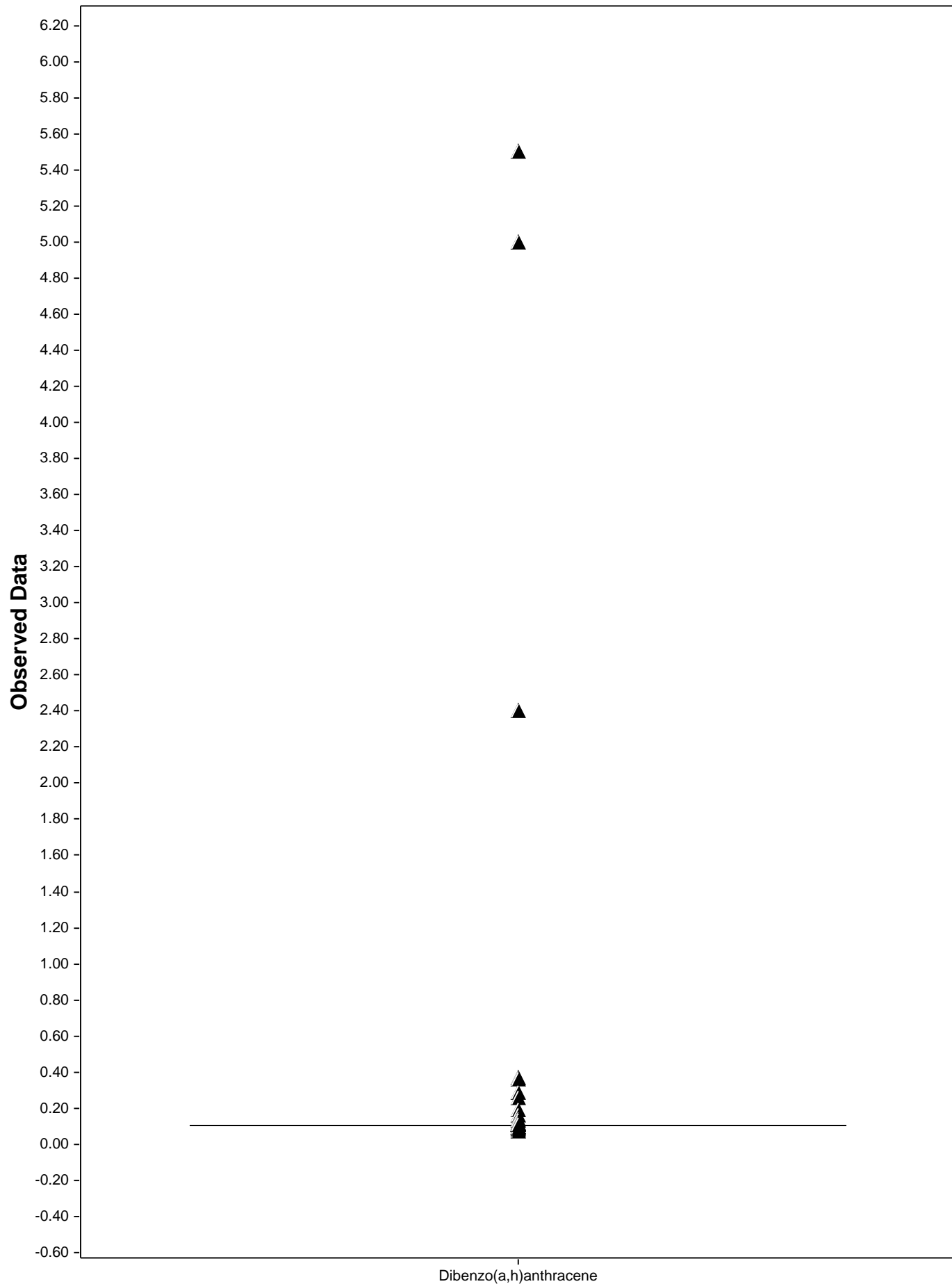
Box Plot for cis-12-DCDE



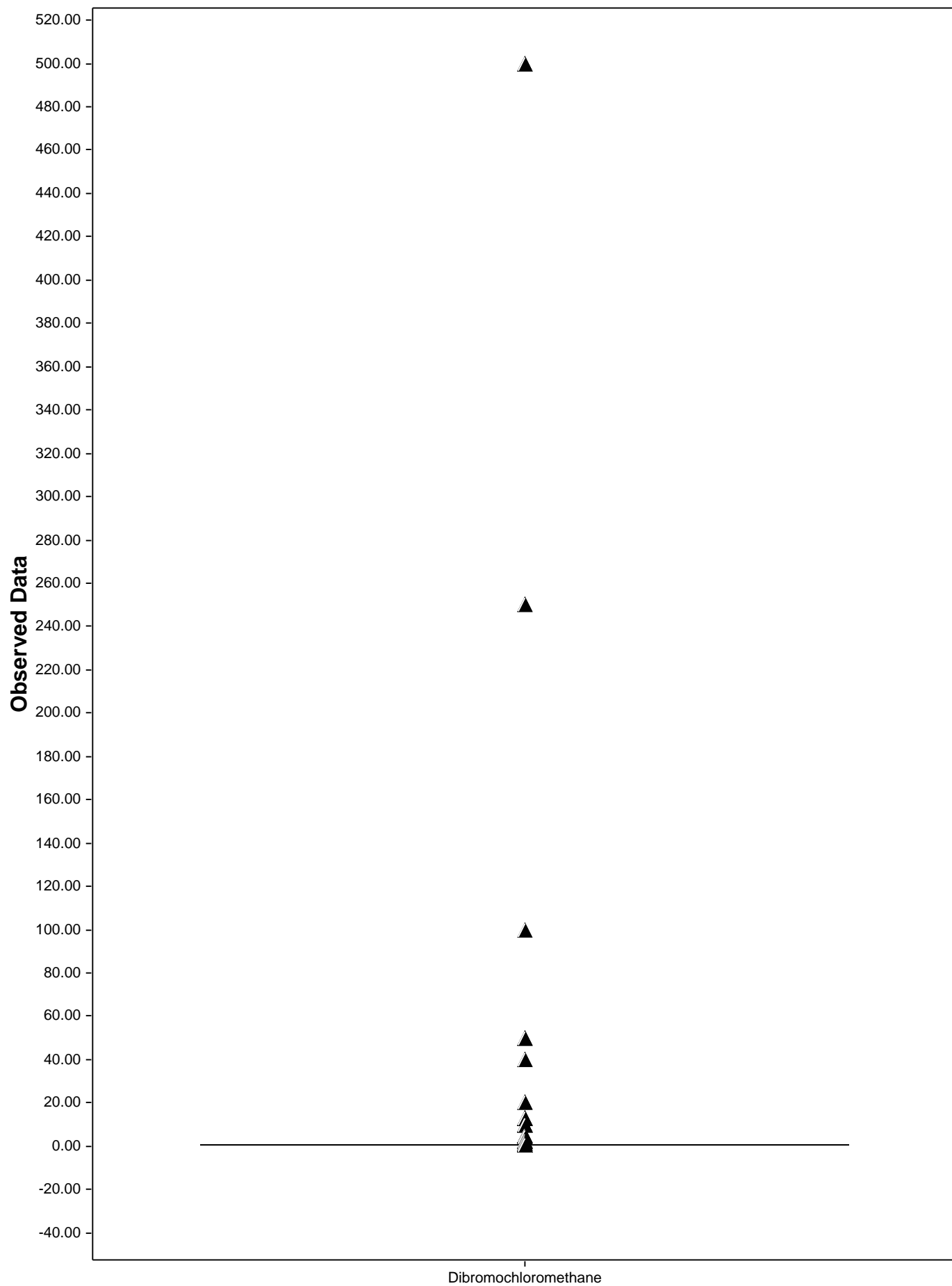
Box Plot for Cobalt



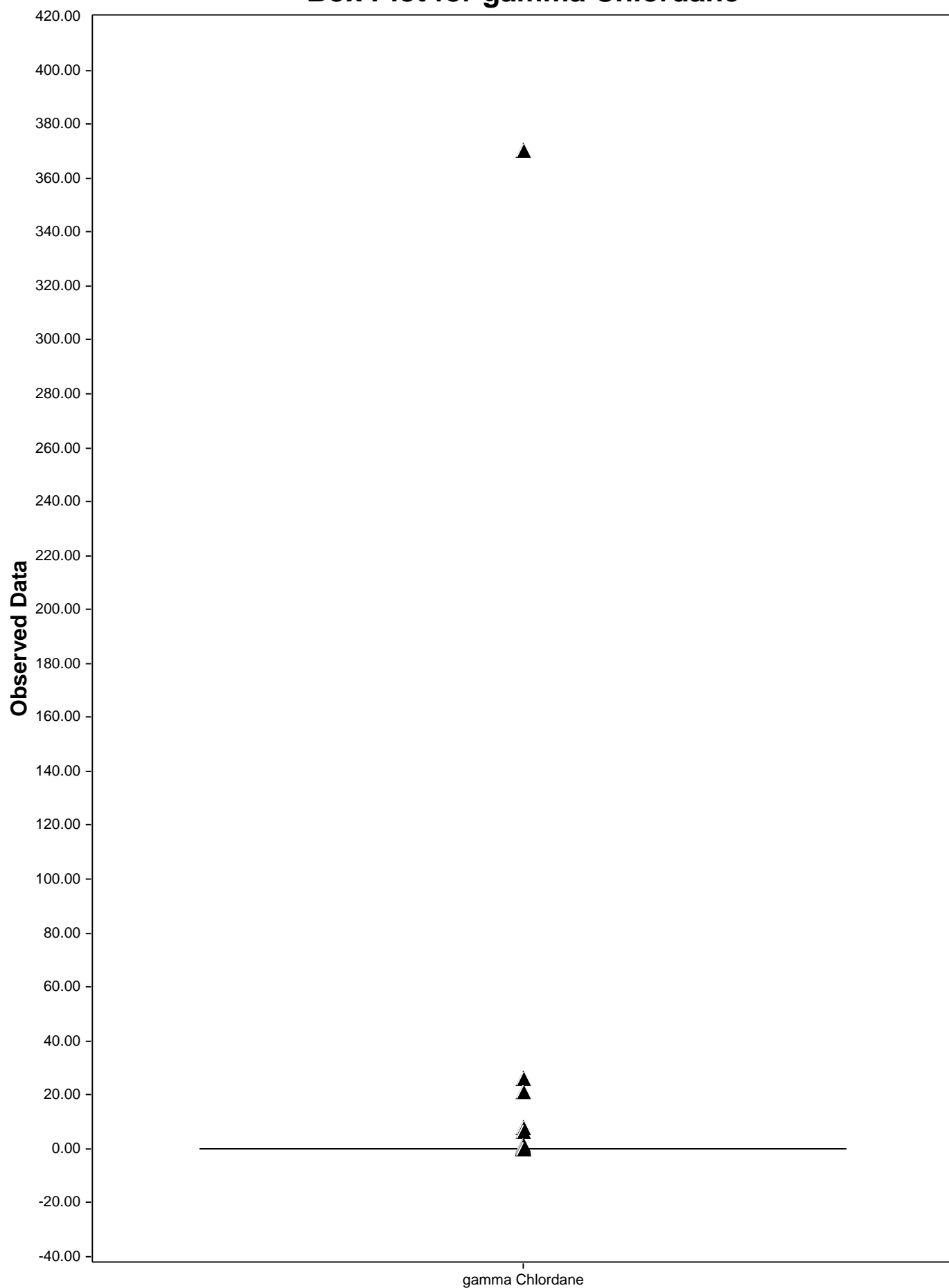
Box Plot for Dibenzo(a,h)anthracene



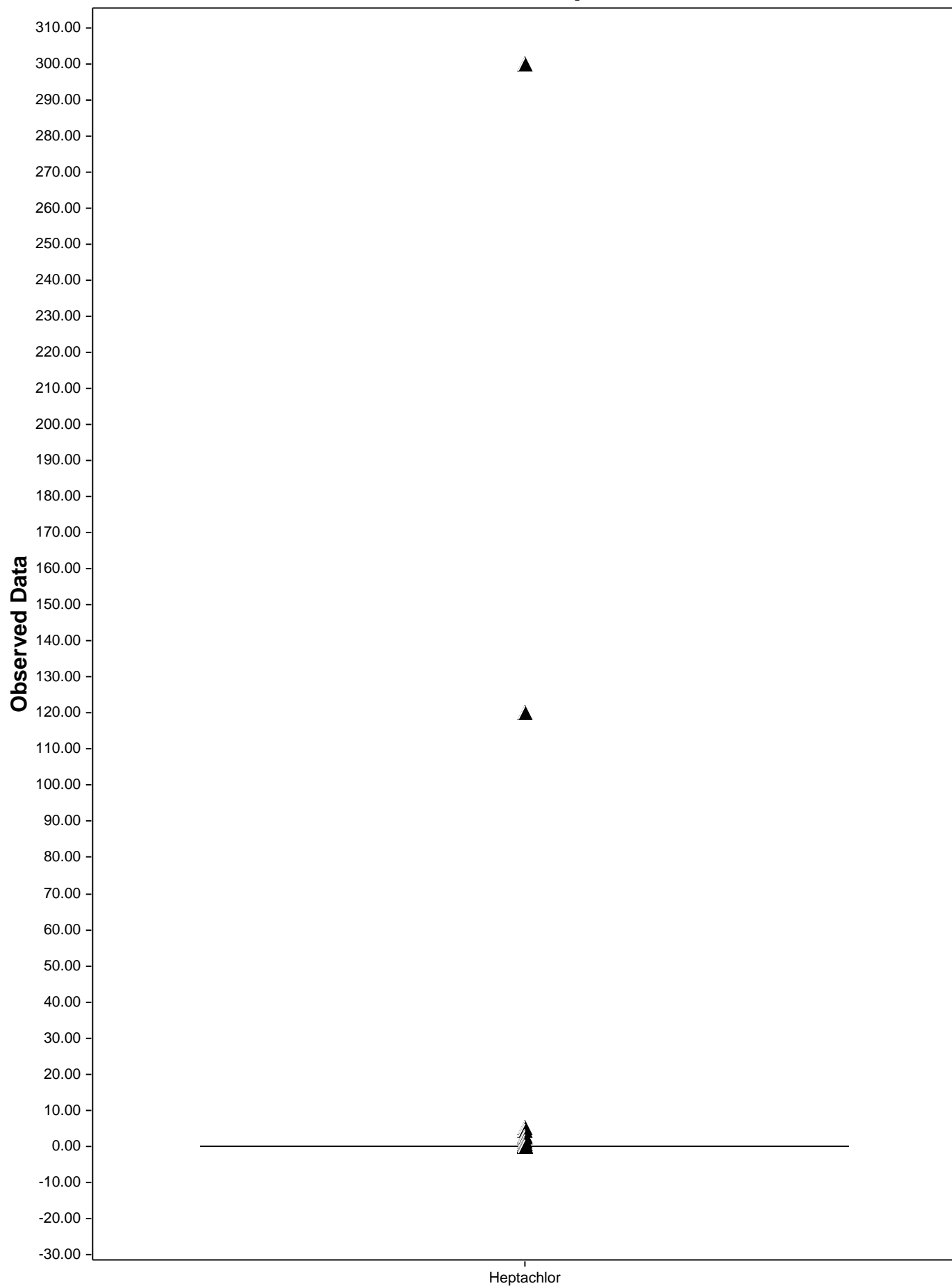
Box Plot for Dibromochloromethane



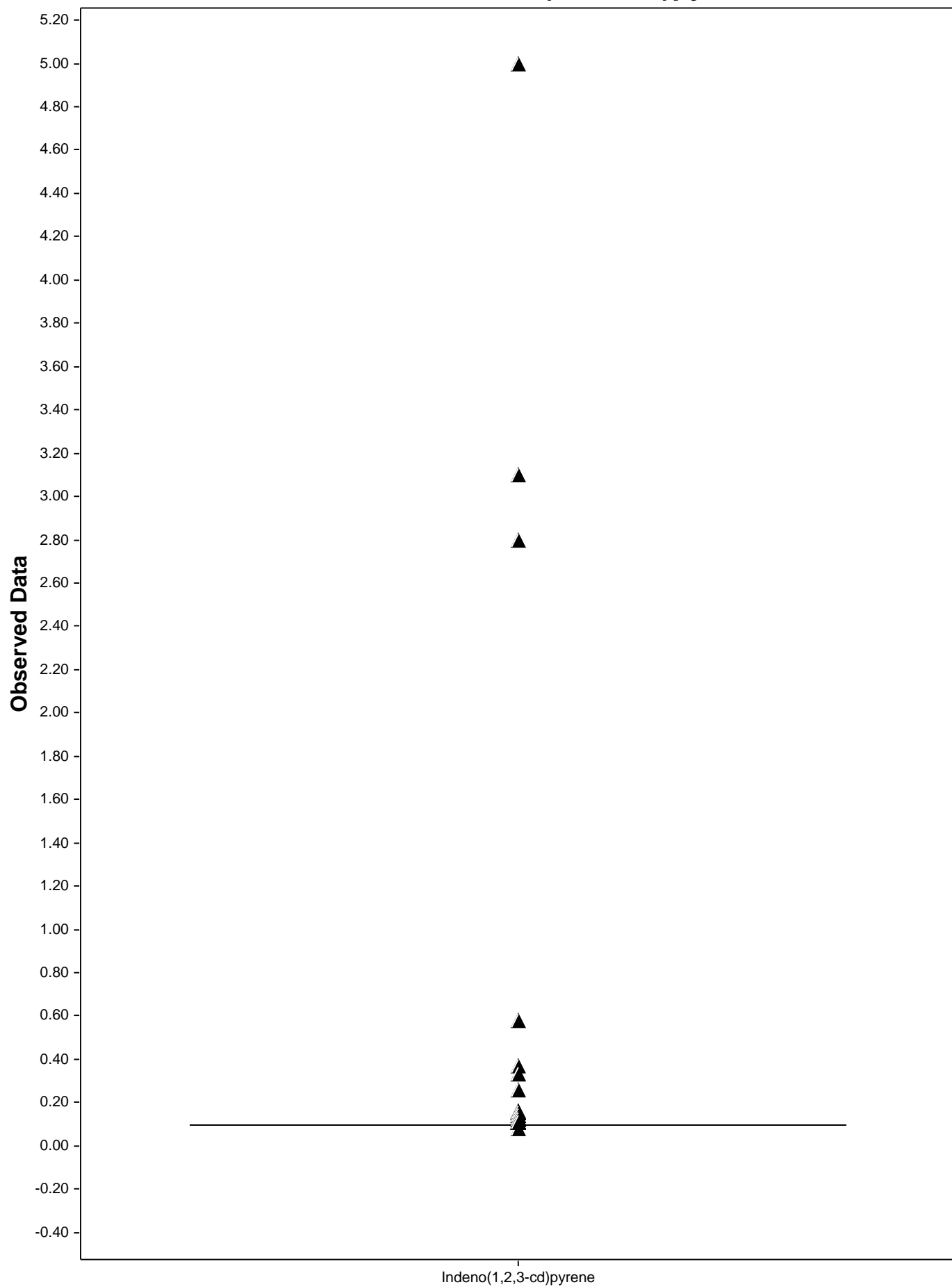
Box Plot for gamma Chlordane



Box Plot for Heptachlor



Box Plot for Indeno(1,2,3-cd)pyrene

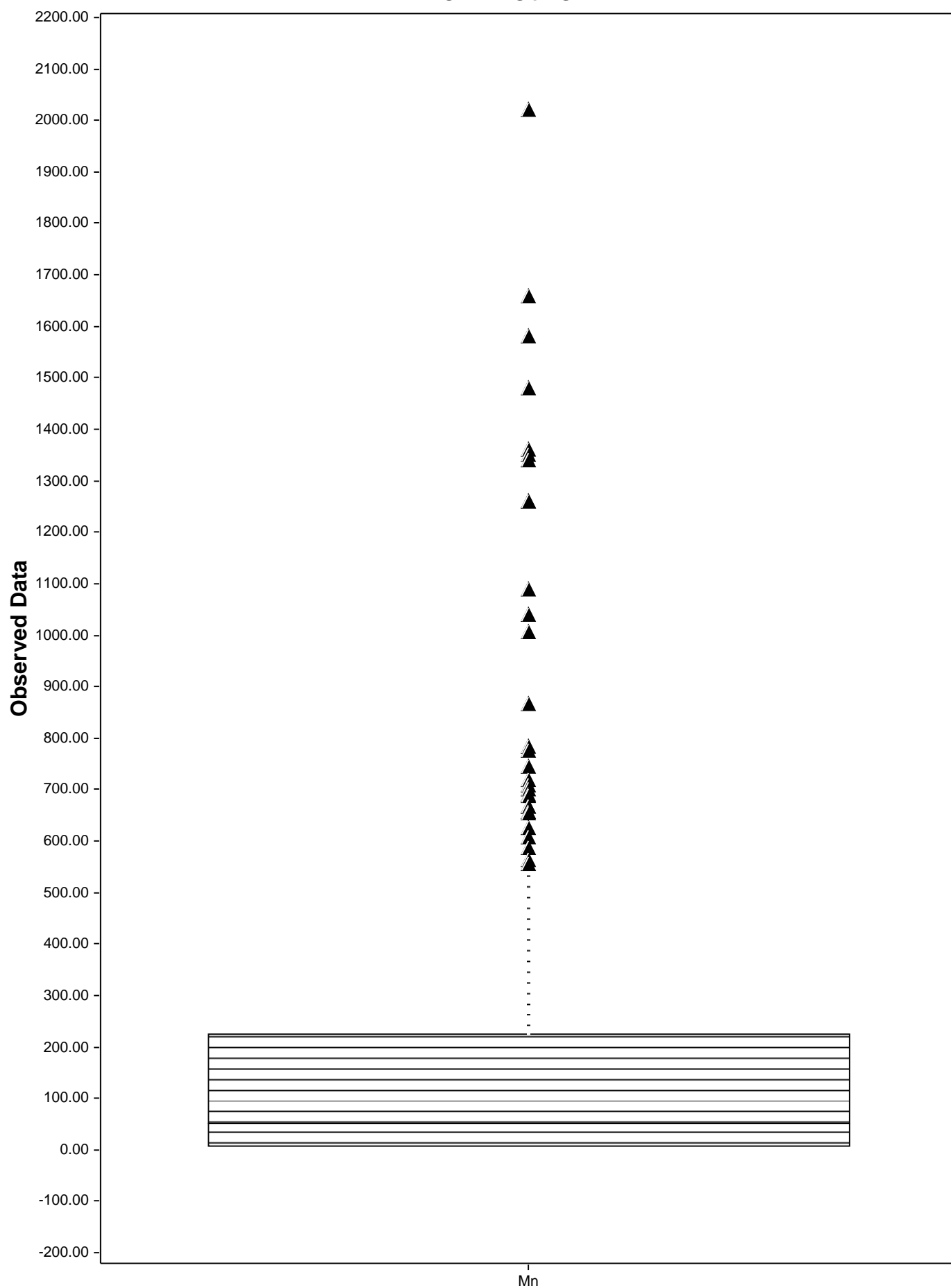


A box plot titled "Box Plot for Iron" showing the distribution of "Observed Data" for the "Iron" category. The y-axis ranges from 0.00 to 9000.00. The plot shows a central box plot with a median near 0, a box extending from approximately 0 to 200, and whiskers extending from -1000 to 1000. Numerous data points are plotted as black triangles, with a dense cluster near 0 and several outliers reaching up to approximately 8500.

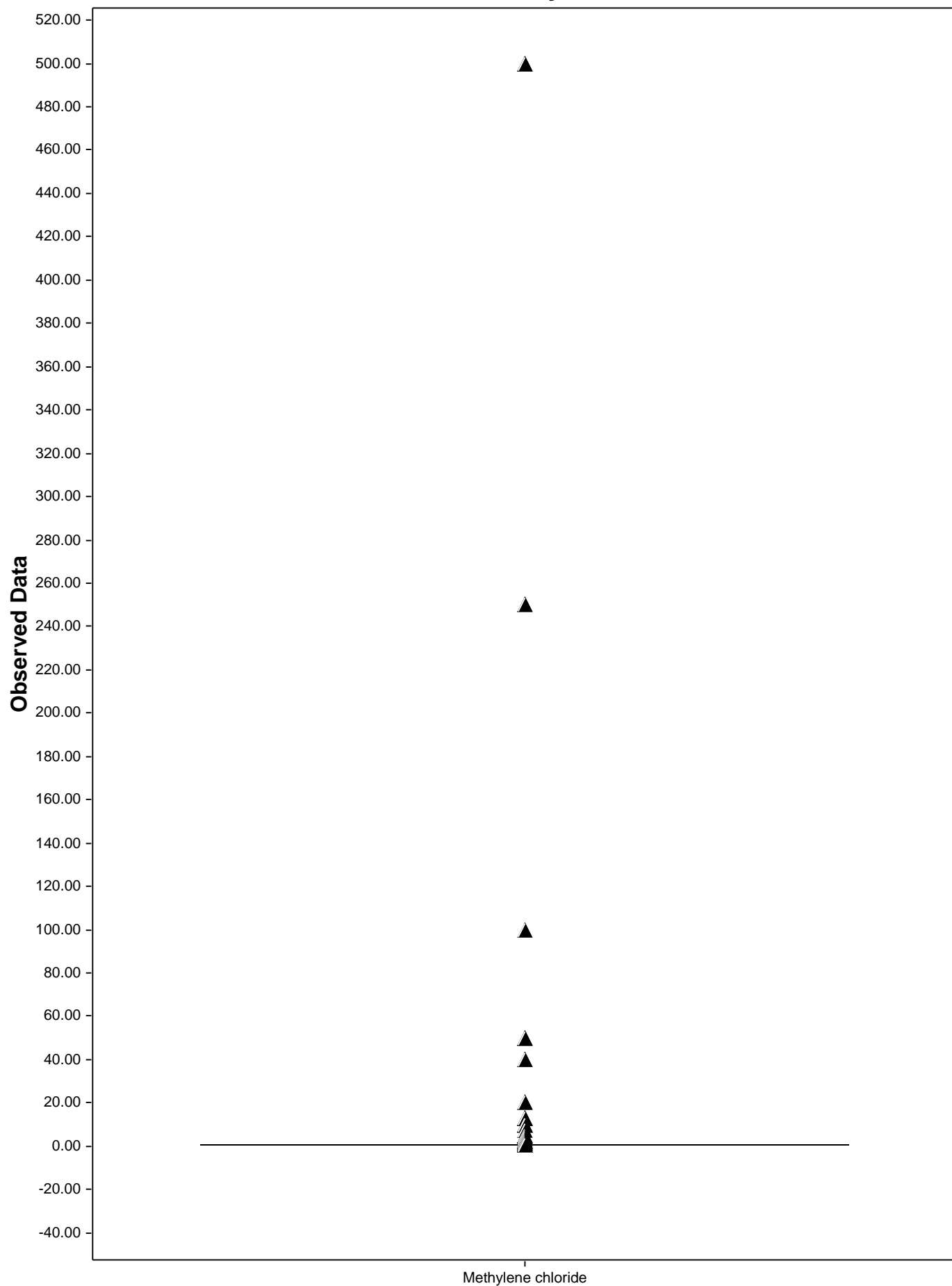
Observed Data (Approximate)
0
100
200
300
400
500
600
700
800
900
1000
1200
1600
1800
2200
2400
4200
8000
8300
8500

Observed Data

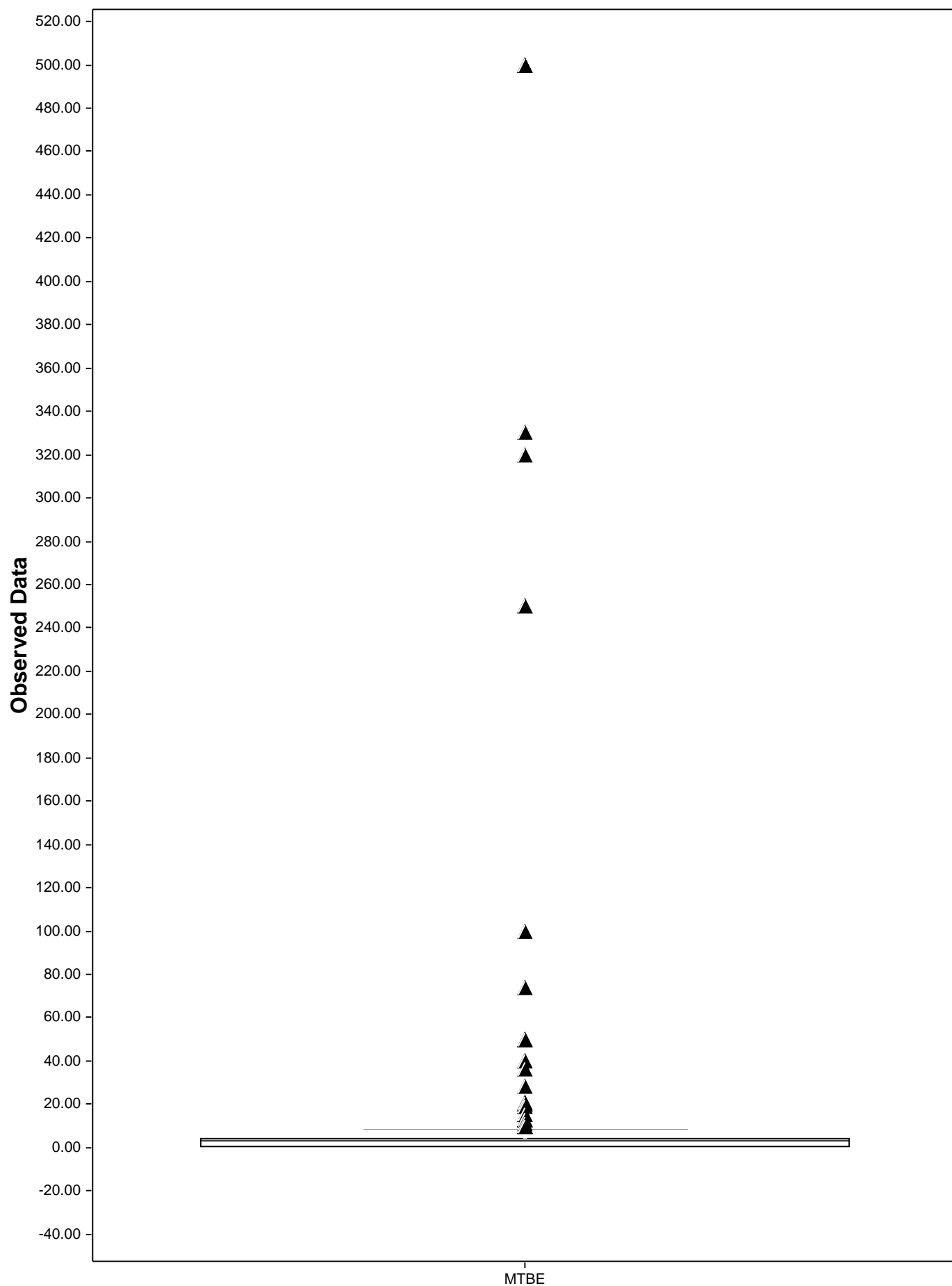
Box Plot for Mn



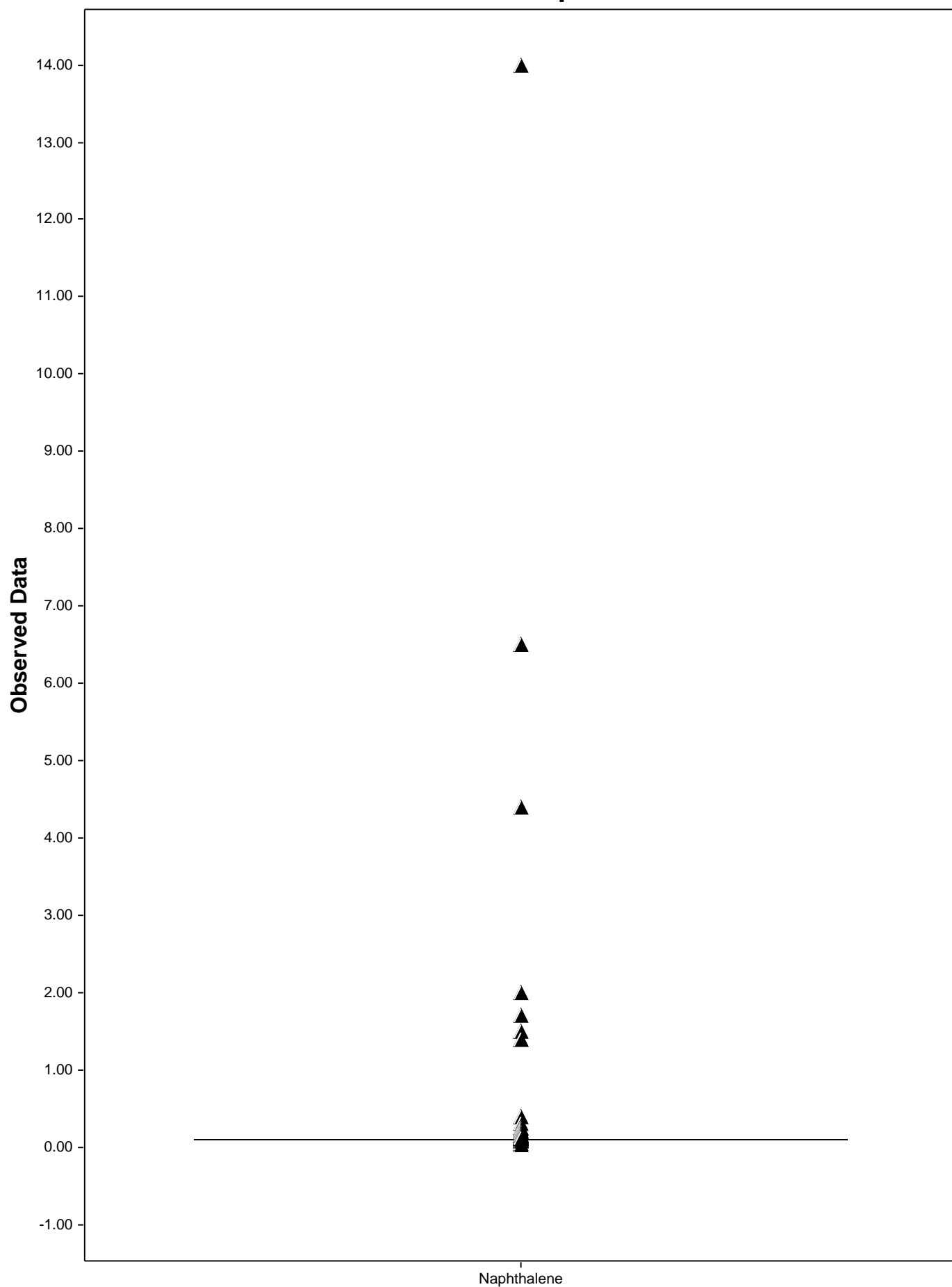
Box Plot for Methylene chloride



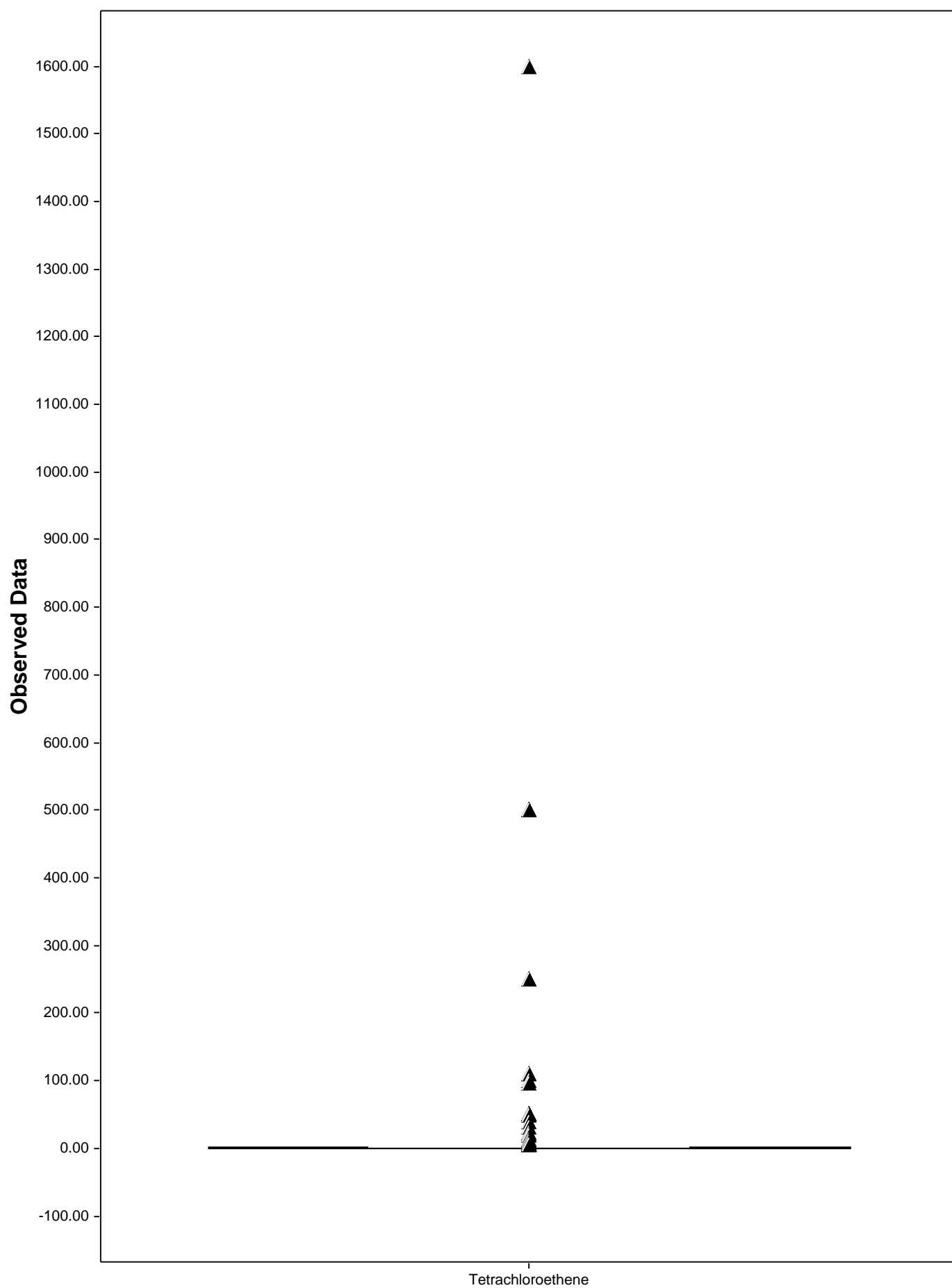
Box Plot for MTBE



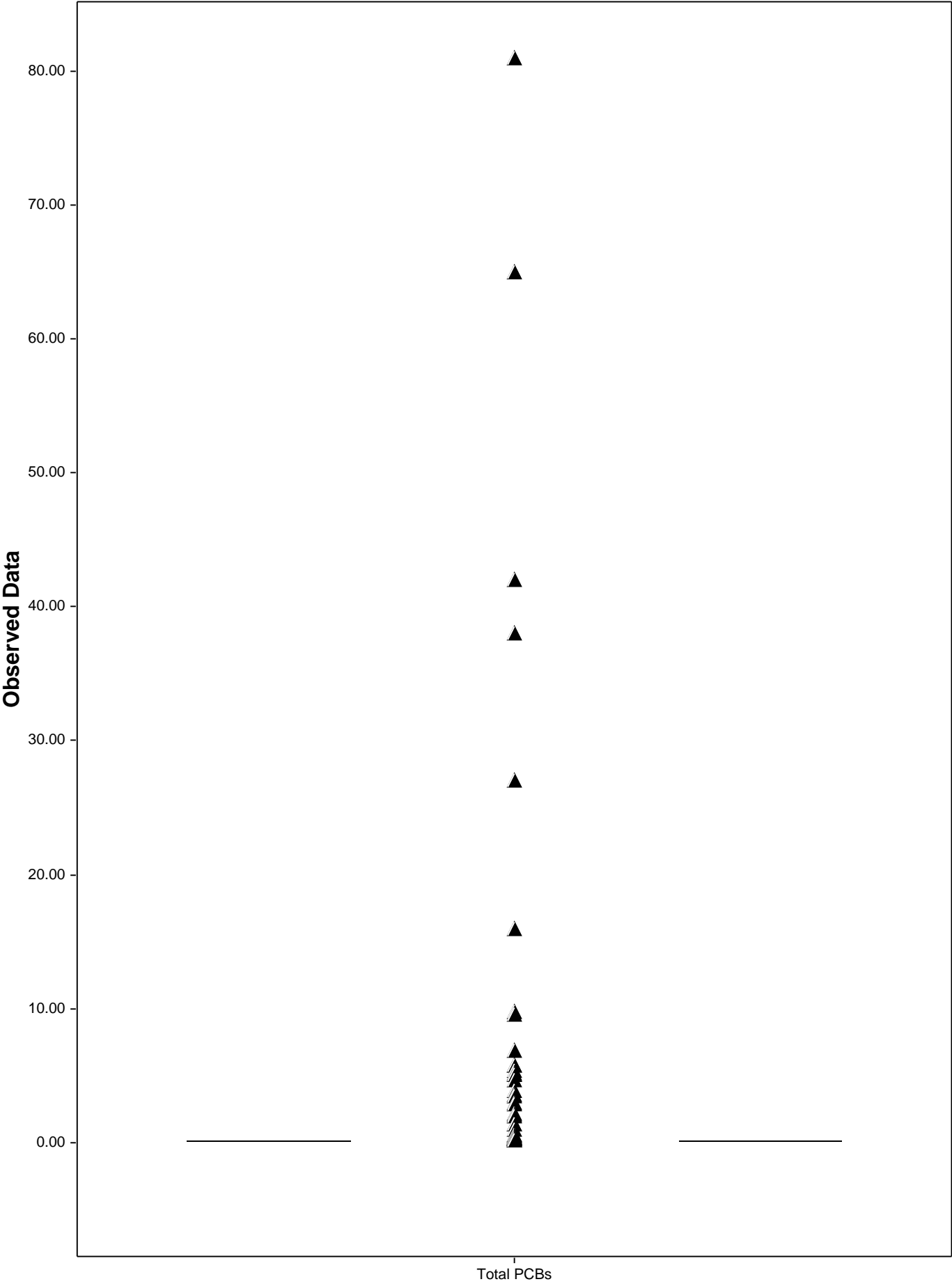
Box Plot for Naphthalene



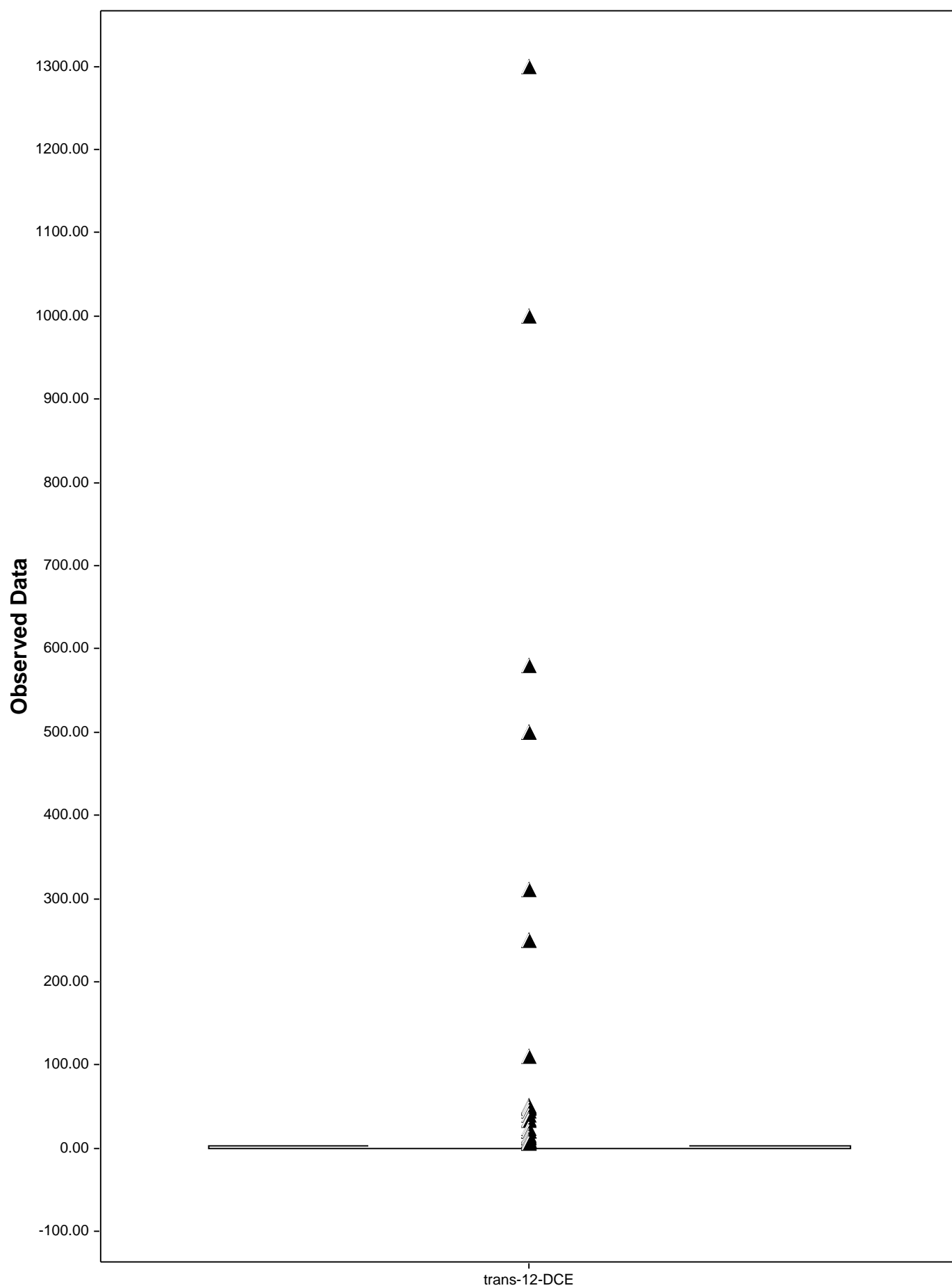
Box Plot for Tetrachloroethene



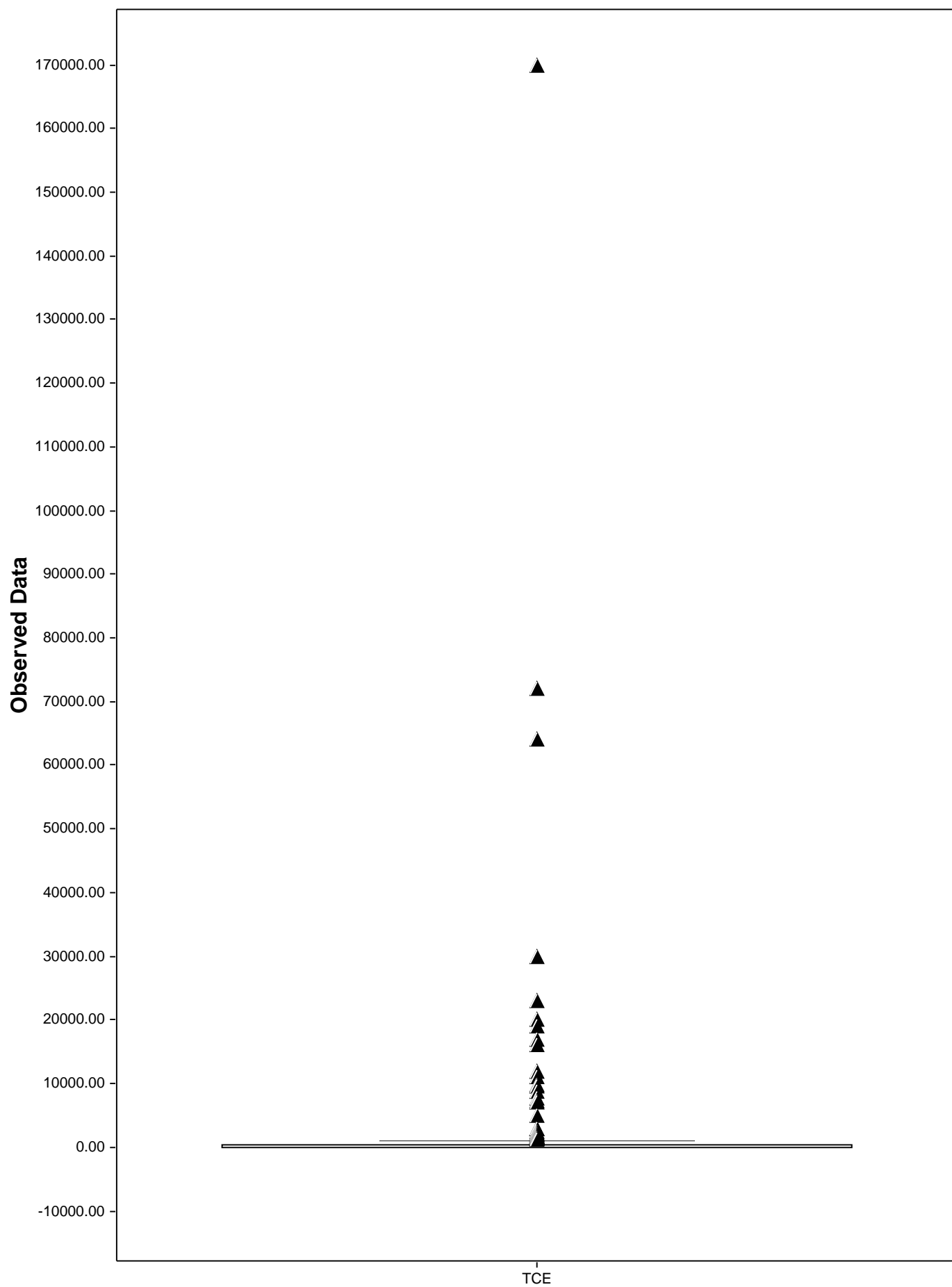
Box Plot for Total PCBs



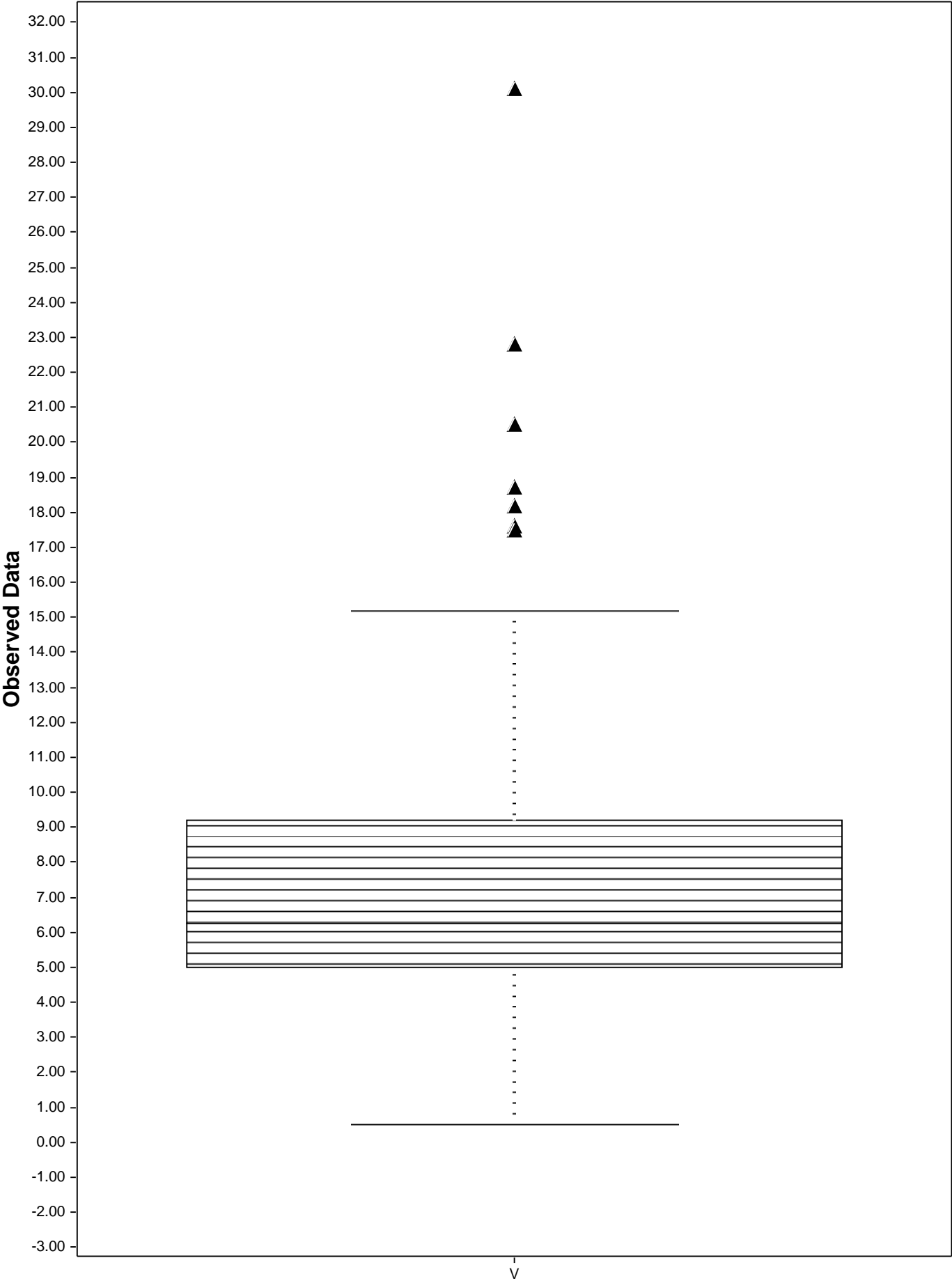
Box Plot for trans-12-DCE



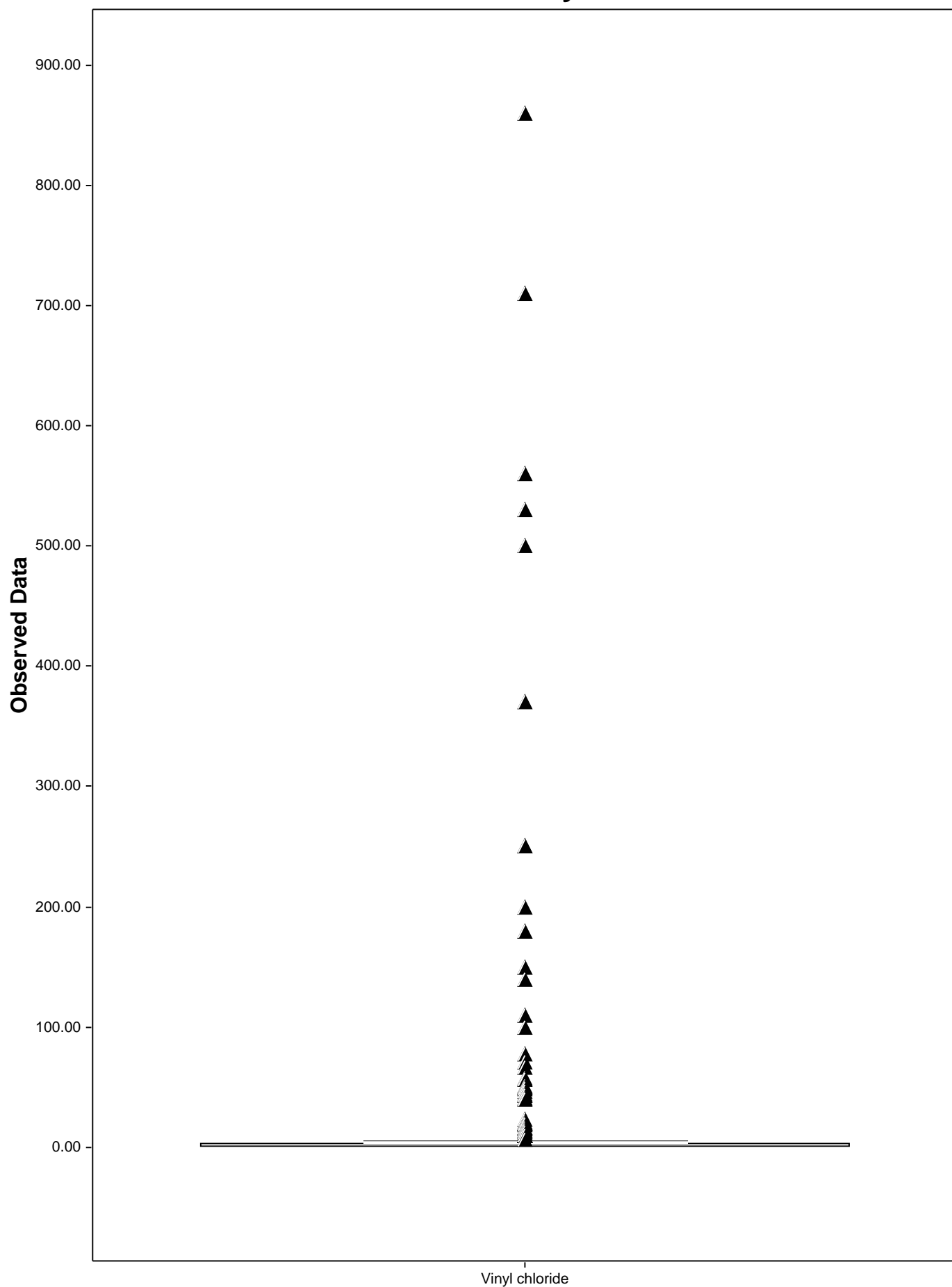
Box Plot for TCE



Box Plot for V



Box Plot for Vinyl chloride



Benzene

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	14
		Percent Non-Detects	87.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.21	Minimum Detected	-1.561
Maximum Detected	1.8	Maximum Detected	0.588
Mean of Detected	1.005	Mean of Detected	-0.486
SD of Detected	1.124	SD of Detected	1.519
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	16
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.407	Mean	-1.173
SD	0.448	SD	0.621
95% DL/2 (t) UCL	0.603	95% H-Stat (DL/2) UCL	0.533
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.316
5% K-S Critical Value	N/A	SD	0.397
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.145
		95% KM (t) UCL	0.57
Assuming Gamma Distribution		95% KM (z) UCL	0.554
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.379
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	1.8
Mean	N/A	95% KM (Percentile Bootstrap) UCL	1.8
Median	N/A	95% KM (Chebyshev) UCL	0.947
SD	N/A	97.5% KM (Chebyshev) UCL	1.22
k star	N/A	99% KM (Chebyshev) UCL	1.757
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	97.5% KM (Chebyshev) UCL	1.22
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Bromodichloromethane

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	14
		Percent Non-Detects	87.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.25	Minimum Detected	-1.386
Maximum Detected	0.7	Maximum Detected	-0.357
Mean of Detected	0.475	Mean of Detected	-0.871
SD of Detected	0.318	SD of Detected	0.728
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	16
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.341	Mean	-1.221
SD	0.267	SD	0.463
95% DL/2 (t) UCL	0.458	95% H-Stat (DL/2) UCL	0.417
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.28
5% K-S Critical Value	N/A	SD	0.112
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.041
		95% KM (t) UCL	0.352
Assuming Gamma Distribution		95% KM (z) UCL	0.347
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.581
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	0.7
Mean	N/A	95% KM (Percentile Bootstrap) UCL	0.7
Median	N/A	95% KM (Chebyshev) UCL	0.459
SD	N/A	97.5% KM (Chebyshev) UCL	0.536
k star	N/A	99% KM (Chebyshev) UCL	0.688
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.352
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	0.7
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Chloroform

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	11
		Percent Non-Detects	68.75%
Raw Statistics	Log-transformed Statistics		
Minimum Detected	0.68	Minimum Detected	-0.386
Maximum Detected	3	Maximum Detected	1.099
Mean of Detected	1.874	Mean of Detected	0.454
SD of Detected	1.065	SD of Detected	0.705
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	14
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	87.50%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.842	Shapiro Wilk Test Statistic	0.804
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution		
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.82	Mean	-0.711
SD	0.95	SD	0.973
95% DL/2 (t) UCL	1.236	95% H-Stat (DL/2) UCL	1.54
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.907
		SD in Log Scale	1.175
		Mean in Original Scale	0.769
		SD in Original Scale	0.955
		95% t UCL	1.188
		95% Percentile Bootstrap UCL	1.177
		95% BCA Bootstrap UCL	1.251
		95% H-UCL	1.992

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	1.343	Data Distribution Test with Detected Values Only	
Theta Star	1.395	Data appear Normal at 5% Significance Level	
nu star	13.43		
A-D Test Statistic	0.611	Nonparametric Statistics	
5% A-D Critical Value	0.683	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.683	Mean	1.062
5% K-S Critical Value	0.359	SD	0.773
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.219
		95% KM (t) UCL	1.445
Assuming Gamma Distribution		95% KM (z) UCL	1.421
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	1.381
Minimum	1.00E-06	95% KM (bootstrap t) UCL	1.453
Maximum	3	95% KM (BCA) UCL	2.563
Mean	0.586	95% KM (Percentile Bootstrap) UCL	2.481
Median	1.00E-06	95% KM (Chebyshev) UCL	2.015
SD	1.052	97.5% KM (Chebyshev) UCL	2.427
k star	0.117	99% KM (Chebyshev) UCL	3.237
Theta star	4.999		
Nu star	3.749	Potential UCLs to Use	
AppChi2	0.625	95% KM (t) UCL	1.445
95% Gamma Approximate UCL	3.512	95% KM (Percentile Bootstrap) UCL	2.481
95% Adjusted Gamma UCL	4.387		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

cis-1,2-Dichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	16 Number of Detected Data	12
Number of Distinct Detected Data	12 Number of Non-Detect Data	4
	Percent Non-Detects	25.00%
Raw Statistics	Log-transformed Statistics	
Minimum Detected	0.32 Minimum Detected	-1.139
Maximum Detected	110 Maximum Detected	4.7
Mean of Detected	21.7 Mean of Detected	1.684
SD of Detected	32.28 SD of Detected	2.074
Minimum Non-Detect	0.5 Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5 Maximum Non-Detect	-0.693

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.71 Shapiro Wilk Test Statistic	0.917
5% Shapiro Wilk Critical Value	0.859 5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	16.34 Mean	0.916
95% DL/2 (t) UCL	29.26 SD	2.245
	29.16 95% H-Stat (DL/2) UCL	544.3

Maximum Likelihood Estimate(MLE) Method

Mean	Log ROS Method	
SD	1.62 Mean in Log Scale	1.005
95% MLE (t) UCL	42.91 SD in Log Scale	2.199
95% MLE (Tiku) UCL	20.42 Mean in Original Scale	16.4
	23.44 SD in Original Scale	29.22
	95% t UCL	29.21
	95% Percentile Bootstrap UCL	29.4
	95% BCA Bootstrap UCL	33.15
	95% H UCL	482

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	Data Distribution Test with Detected Values Only	
Theta Star	0.402 Data appear Gamma Distributed at 5% Significance Level	
nu star	54.01	
	9.642	

A-D Test Statistic

5% A-D Critical Value	0.354 Nonparametric Statistics	
K-S Test Statistic	0.792 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.792 Mean	16.37
Data appear Gamma Distributed at 5% Significance Level	0.26 SD	28.31

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	SE of Mean	7.392
Minimum	95% KM (t) UCL	29.33
Maximum	95% KM (z) UCL	28.53
Mean	95% KM (jackknife) UCL	29.18
Median	1.00E-06 95% KM (bootstrap t) UCL	42.04
SD	110 95% KM (BCA) UCL	30.79
k star	16.27 95% KM (Percentile Bootstrap) UCL	29.47
Theta star	1.465 95% KM (Chebyshev) UCL	48.59
Nu star	29.3 97.5% KM (Chebyshev) UCL	62.54
AppChi2	0.167 99% KM (Chebyshev) UCL	89.92
95% Gamma Approximate UCL	97.68	
95% Adjusted Gamma UCL	5.331 Potential UCLs to Use	
Note: DL/2 is not a recommended method.	1.308 95% KM (Chebyshev) UCL	48.59
	66.32	
	79.05	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Tetrachloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	13
		Percent Non-Detects	81.25%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.19	Minimum Detected	-1.661
Maximum Detected	0.81	Maximum Detected	-0.211
Mean of Detected	0.427	Mean of Detected	-1.048
SD of Detected	0.335	SD of Detected	0.751
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	2.5	Maximum Non-Detect	0.916
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	16
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.856	Shapiro Wilk Test Statistic	0.933
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.346	Mean	-1.222
SD	0.279	SD	0.492
95% DL/2 (t) UCL	0.468	95% H-Stat (DL/2) UCL	0.431
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.386
		SD in Log Scale	0.528
		Mean in Original Scale	0.287
		SD in Original Scale	0.174
		95% t UCL	0.364
		95% Percentile Bootstrap UCL	0.36
		95% BCA Bootstrap UCL	0.387
		95% H-UCL	0.382

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only	
Theta Star	N/A	Data appear Normal at 5% Significance Level	
nu star	N/A		

A-D Test Statistic

5% A-D Critical Value	N/A	Nonparametric Statistics	
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method	
5% K-S Critical Value	N/A	Mean	0.273
Data not Gamma Distributed at 5% Significance Level		SD	0.15

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data		SE of Mean	0.0581
Minimum	N/A	95% KM (t) UCL	0.375
Maximum	N/A	95% KM (z) UCL	0.369
Mean	N/A	95% KM (jackknife) UCL	0.394
Median	N/A	95% KM (bootstrap t) UCL	0.431
SD	N/A	95% KM (BCA) UCL	0.81
k star	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Theta star	N/A	95% KM (Chebyshev) UCL	0.527
Nu star	N/A	97.5% KM (Chebyshev) UCL	0.636
AppChi2	N/A	99% KM (Chebyshev) UCL	0.852
95% Gamma Approximate UCL	N/A	Potential UCLs to Use	
95% Adjusted Gamma UCL	N/A	95% KM (t) UCL	0.375
		95% KM (Percentile Bootstrap) UCL	N/A

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics - Data are in µg/L.

Number of Valid Data	16 Number of Detected Data	14
Number of Distinct Detected Data	14 Number of Non-Detect Data	2
	Percent Non-Detects	12.50%
Raw Statistics	Log-transformed Statistics	
Minimum Detected	0.43 Minimum Detected	-0.844
Maximum Detected	310 Maximum Detected	5.737
Mean of Detected	42.1 Mean of Detected	2.115
SD of Detected	84.77 SD of Detected	1.871
Minimum Non-Detect	0.5 Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5 Maximum Non-Detect	-0.693

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.556 Shapiro Wilk Test Statistic	0.922
5% Shapiro Wilk Critical Value	0.874 5% Shapiro Wilk Critical Value	0.874
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	36.86 Mean	1.677
95% DL/2 (t) UCL	80.2 SD	2.113
	72.01 95% H-Stat (DL/2) UCL	642.2

Maximum Likelihood Estimate(MLE) Method

Mean	Log ROS Method	
SD	25.11 Mean in Log Scale	1.676
95% MLE (t) UCL	89.15 SD in Log Scale	2.121
95% MLE (Tiku) UCL	64.18 Mean in Original Scale	36.87
	63.03 SD in Original Scale	80.2
	95% t UCL	72.02
	95% Percentile Bootstrap UCL	72.17
	95% BCA Bootstrap UCL	88.67
	95% H UCL	663.7

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	Data Distribution Test with Detected Values Only	
Theta Star	0.365 Data appear Lognormal at 5% Significance Level	
nu star	115.2	
	10.23	

A-D Test Statistic

5% A-D Critical Value	1.178 Nonparametric Statistics	
K-S Test Statistic	0.812 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.812 Mean	36.89
Data not Gamma Distributed at 5% Significance Level	0.245 SD	77.65

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data	SE of Mean	20.14
Minimum	95% KM (t) UCL	72.2
Maximum	95% KM (z) UCL	70.02
Mean	95% KM (jackknife) UCL	71.93
Median	95% KM (bootstrap t) UCL	128.4
SD	310 95% KM (BCA) UCL	76.99
k star	36.83 95% KM (Percentile Bootstrap) UCL	72.45
Theta star	3.95 95% KM (Chebyshev) UCL	124.7
Nu star	80.22 97.5% KM (Chebyshev) UCL	162.7
AppChi2	0.212 99% KM (Chebyshev) UCL	237.3
95% Gamma Approximate UCL	173.7	
95% Adjusted Gamma UCL	6.787 Potential UCLs to Use	
Note: DL/2 is not a recommended method.	2.054 99% KM (Chebyshev) UCL	237.3
	121.7	
	141.1	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Indeno(1,2,3-cd)pyrene

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	3
Number of Distinct Detected Data	2	Number of Non-Detect Data	13
		Percent Non-Detects	81.25%
Raw Statistics	Log-transformed Statistics		
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	0.15	Maximum Detected	-1.897
Mean of Detected	0.137	Mean of Detected	-2.001
SD of Detected	0.0231	SD of Detected	0.179
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1	Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.75
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level		
Assuming Normal Distribution	Assuming Lognormal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method		
Mean	0.0663	Mean	-2.809
SD	0.0359	SD	0.406
95% DL/2 (t) UCL	0.082	95% H-Stat (DL/2) UCL	0.0804
Maximum Likelihood Estimate(MLE) Method	Log ROS Method		
Mean	0.139	Mean in Log Scale	-2.644
SD	0.0189	SD in Log Scale	0.437
95% MLE (t) UCL	0.147	Mean in Original Scale	0.0778
95% MLE (Tiku) UCL	0.158	SD in Original Scale	0.0352
		95% t UCL	0.0932
		95% Percentile Bootstrap UCL	0.0918
		95% BCA Bootstrap UCL	0.0948
		95% H UCL	0.0979

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only	
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)	
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.115
5% K-S Critical Value	N/A	SD	0.0132
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00405
		95% KM (t) UCL	0.122
		95% KM (z) UCL	0.122
Assuming Gamma Distribution		95% KM (jackknife) UCL	N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	N/A
Minimum	N/A	95% KM (BCA) UCL	N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Mean	N/A	95% KM (Chebyshev) UCL	0.133
Median	N/A	97.5% KM (Chebyshev) UCL	0.14
SD	N/A	99% KM (Chebyshev) UCL	0.155
k star	N/A		
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.122
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	14
		Percent Non-Detects	87.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.1	Minimum Detected	-2.303
Maximum Detected	0.16	Maximum Detected	-1.833
Mean of Detected	0.13	Mean of Detected	-2.068
SD of Detected	0.0424	SD of Detected	0.332
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1	Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.06	Mean	-2.88
SD	0.0294	SD	0.328
95% DL/2 (t) UCL	0.0729	95% H-Stat (DL/2) UCL	0.0696
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.104
5% K-S Critical Value	N/A	SD	0.0145
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.00513
		95% KM (t) UCL	0.113
		95% KM (z) UCL	0.112
Assuming Gamma Distribution		95% KM (jackknife) UCL	N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	N/A
Minimum	N/A	95% KM (BCA) UCL	N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Mean	N/A	95% KM (Chebyshev) UCL	0.126
Median	N/A	97.5% KM (Chebyshev) UCL	0.136
SD	N/A	99% KM (Chebyshev) UCL	0.155
k star	N/A		
Theta star	N/A	Potential UCLs to Use	
Nu star	N/A	95% KM (t) UCL	0.113
AppChi2	N/A	95% KM (% Bootstrap) UCL	N/A
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Total Polychlorinated Biphenyls (Aroclors)

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	13
		Percent Non-Detects	81.25%
Raw Statistics	Log-transformed Statistics		
Minimum Detected	0.038	Minimum Detected	-3.27
Maximum Detected	2.2	Maximum Detected	0.788
Mean of Detected	0.896	Mean of Detected	-1.093
SD of Detected	1.148	SD of Detected	2.045
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	14
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	87.50%

Warning: There are only 3 Distinct Detected Values in this data set

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.887	Shapiro Wilk Test Statistic	0.984
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.198	Mean	-2.926
SD	0.544	SD	1.214
95% DL/2 (t) UCL	0.436	95% H-Stat (DL/2) UCL	0.291
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.981
		SD in Log Scale	1.567
		Mean in Original Scale	0.213
		SD in Original Scale	0.541
		95% t UCL	0.45
		95% Percentile Bootstrap UCL	0.459
		95% BCA Bootstrap UCL	0.623
		95% H-UCL	0.764
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.199
5% K-S Critical Value	N/A	SD	0.526
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.161
		95% KM (t) UCL	0.481
Assuming Gamma Distribution		95% KM (z) UCL	0.464
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.515
Minimum	N/A	95% KM (bootstrap t) UCL	0.662
Maximum	N/A	95% KM (BCA) UCL	2.2
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	0.901
SD	N/A	97.5% KM (Chebyshev) UCL	1.205
k star	N/A	99% KM (Chebyshev) UCL	1.802
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.481
95% Gamma Approximate UCL	N/A	95% KM (Percentile Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		
Note: DL/2 is not a recommended method.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

4,4'-DDD

General Statistics - Data are in µg/L.

Number of Valid Data	6	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	4
		Percent Non-Detects	66.67%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	0.76	Maximum Detected	-0.274
Mean of Detected	0.435	Mean of Detected	-1.241
SD of Detected	0.46	SD of Detected	1.367
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect

Number treated as Detected

Single DL Non-Detect Percentage

4

2

66.67%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic

5% Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

N/A

N/A

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic

5% Shapiro Wilk Critical Value

Data not Lognormal at 5% Significance Level

N/A

N/A

Assuming Normal Distribution

DL/2 Substitution Method

Mean

SD

95% DL/2 (t) UCL

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean

SD

95% H-Stat (DL/2) UCL

-2.395

1.084

1.397

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

N/A

Log ROS Method

Mean in Log Scale

SD in Log Scale

Mean in Original Scale

SD in Original Scale

95% t UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% H-UCL

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)

Theta Star

nu star

N/A

N/A

N/A

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic

5% A-D Critical Value

K-S Test Statistic

5% K-S Critical Value

Data not Gamma Distributed at 5% Significance Level

N/A

N/A

N/A

N/A

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean

SD

SE of Mean

95% KM (t) UCL

95% KM (z) UCL

95% KM (jackknife) UCL

95% KM (bootstrap t) UCL

95% KM (BCA) UCL

95% KM (Percentile Bootstrap) UCL

95% KM (Chebyshev) UCL

97.5% KM (Chebyshev) UCL

99% KM (Chebyshev) UCL

0.218

0.242

0.14

0.5

0.448

N/A

N/A

N/A

N/A

0.828

1.092

1.61

Theta star

Nu star

AppChi2

95% Gamma Approximate UCL

95% Adjusted Gamma UCL

N/A

N/A

N/A

N/A

N/A

Potential UCLs to Use

95% KM (BCA) UCL

N/A

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

4,4'-DDT

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	14
		Percent Non-Detects	87.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.16	Minimum Detected	-1.833
Maximum Detected	1.5	Maximum Detected	0.405
Mean of Detected	0.83	Mean of Detected	-0.714
SD of Detected	0.948	SD of Detected	1.583
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended

For all methods (except KM, DL/2, and ROS Methods),

Observations < Largest ND are treated as NDs

Number treated as Non-Detect

Number treated as Detected

Single DL Non-Detect Percentage

14

2

87.50%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic

5% Shapiro Wilk Critical Value

Data not Normal at 5% Significance Level

N/A

N/A

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic

5% Shapiro Wilk Critical Value

Data not Lognormal at 5% Significance Level

N/A

N/A

Assuming Normal Distribution

DL/2 Substitution Method

Mean

SD

95% DL/2 (t) UCL

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean

SD

95% H-Stat (DL/2) UCL

-2.705

0.878

0.174

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

N/A

Log ROS Method

Mean in Log Scale

SD in Log Scale

Mean in Original Scale

SD in Original Scale

95% t UCL

95% Percentile Bootstrap UCL

95% BCA Bootstrap UCL

95% H-UCL

N/A

N/A

N/A

N/A

N/A

N/A

N/A

N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)

Theta Star

nu star

N/A

N/A

N/A

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic

5% A-D Critical Value

K-S Test Statistic

5% K-S Critical Value

Data not Gamma Distributed at 5% Significance Level

N/A

N/A

N/A

N/A

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean

SD

SE of Mean

95% KM (t) UCL

95% KM (z) UCL

95% KM (jackknife) UCL

95% KM (bootstrap t) UCL

95% KM (BCA) UCL

95% KM (Percentile Bootstrap) UCL

95% KM (Chebyshev) UCL

97.5% KM (Chebyshev) UCL

99% KM (Chebyshev) UCL

0.244

0.324

0.115

0.445

0.432

1.142

N/A

N/A

1.5

0.744

0.96

1.385

Theta star

Nu star

AppChi2

95% Gamma Approximate UCL

95% Adjusted Gamma UCL

N/A

N/A

N/A

N/A

N/A

Potential UCLs to Use

97.5% KM (Chebyshev) UCL

0.96

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Antimony

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	14
		Percent Non-Detects	87.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.51	Minimum Detected	-0.673
Maximum Detected	2.2	Maximum Detected	0.788
Mean of Detected	1.355	Mean of Detected	0.0576
SD of Detected	1.195	SD of Detected	1.034
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	2	Maximum Non-Detect	0.693

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.044	Mean	0.00719
SD	0.332	SD	0.268
95% DL/2 (t) UCL	1.19	95% H-Stat (DL/2) UCL	1.186
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.616
5% K-S Critical Value	N/A	SD	0.409
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.145
		95% KM (t) UCL	0.869
		95% KM (z) UCL	0.854
Assuming Gamma Distribution		95% KM (jackknife) UCL	N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	N/A
Minimum	N/A	95% KM (BCA) UCL	N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Mean	N/A	95% KM (Chebyshev) UCL	1.246
Median	N/A	97.5% KM (Chebyshev) UCL	1.519
SD	N/A	99% KM (Chebyshev) UCL	2.055
k star	N/A		
Theta star	N/A	Potential UCLs to Use	
Nu star	N/A	95% KM (BCA) UCL	N/A
AppChi2	N/A		
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics - Data are in µg/L.

Number of Valid Observations	16	Number of Distinct Observations	16
Raw Statistics	Log-transformed Statistics		
Minimum	0.75	Minimum of Log Data	-0.288
Maximum	180	Maximum of Log Data	5.193
Mean	52.26	Mean of log Data	2.777
Median	16.7	SD of log Data	1.895
SD	61.13		
Std. Error of Mean	15.28		
Coefficient of Variation	1.17		
Skewness	0.927		
Relevant UCL Statistics	Lognormal Distribution Test		
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.808	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	79.05	95% H-UCL	781.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	257.7
95% Adjusted-CLT UCL (Chen-1995)	81.18	97.5% Chebyshev (MVUE) UCL	336.6
95% Modified-t UCL (Johnson-1978)	79.64	99% Chebyshev (MVUE) UCL	491.5
Gamma Distribution Test	Data Distribution		
k star (bias corrected)	0.475	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	110		
MLE of Mean	52.26		
MLE of Standard Deviation	75.83		
nu star	15.2		
Approximate Chi Square Value (.05)	7.402	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	77.4
Adjusted Chi Square Value	6.79	95% Jackknife UCL	79.05
		95% Standard Bootstrap UCL	76.58
Anderson-Darling Test Statistic	0.631	95% Bootstrap-t UCL	85.1
Anderson-Darling 5% Critical Value	0.793	95% Hall's Bootstrap UCL	78.35
Kolmogorov-Smirnov Test Statistic	0.195	95% Percentile Bootstrap UCL	76.02
Kolmogorov-Smirnov 5% Critical Value	0.227	95% BCA Bootstrap UCL	80.18
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	118.9
		97.5% Chebyshev(Mean, Sd) UCL	147.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	204.3
95% Approximate Gamma UCL	107.3		
95% Adjusted Gamma UCL	117		
Potential UCL to Use		Use 95% Approximate Gamma UCL	107.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	9
		Percent Non-Detects	56.25%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	3.5	Maximum Detected	1.253
Mean of Detected	1.121	Mean of Detected	-0.472
SD of Detected	1.23	SD of Detected	1.248
Minimum Non-Detect	0.86	Minimum Non-Detect	-0.151
Maximum Non-Detect	2	Maximum Non-Detect	0.693
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	14
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	2
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	87.50%

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.83	Shapiro Wilk Test Statistic	0.971
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.018	Mean	-0.259
SD	0.796	SD	0.838
95% DL/2 (t) UCL	1.366	95% H-Stat (DL/2) UCL	1.87
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-0.852
		SD in Log Scale	1.034
		Mean in Original Scale	0.721
		SD in Original Scale	0.888
		95% t UCL	1.11
		95% Percentile Bootstrap UCL	1.109
		95% BCA Bootstrap UCL	1.252
		95% H-UCL	1.521

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.658	Data Distribution Test with Detected Values Only	
Theta Star	1.703	Data appear Normal at 5% Significance Level	
nu star	9.218		
A-D Test Statistic	0.21	Nonparametric Statistics	
5% A-D Critical Value	0.728	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.728	Mean	0.736
5% K-S Critical Value	0.32	SD	0.857
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.251
		95% KM (t) UCL	1.176
		95% KM (z) UCL	1.149
		95% KM (jackknife) UCL	1.173
		95% KM (bootstrap t) UCL	1.387
		95% KM (BCA) UCL	1.198
		95% KM (Percentile Bootstrap) UCL	1.181
		95% KM (Chebyshev) UCL	1.83
		97.5% KM (Chebyshev) UCL	2.303
		99% KM (Chebyshev) UCL	3.234
		Potential UCLs to Use	
		95% KM (t) UCL	1.176
		95% KM (Percentile Bootstrap) UCL	1.181
		95% Gamma Approximate UCL	2.078
		95% Adjusted Gamma UCL	2.327

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Cobalt

General Statistics - Data are in µg/L.

Number of Valid Data	16	Number of Detected Data	6
Number of Distinct Detected Data	5	Number of Non-Detect Data	10
		Percent Non-Detects	62.50%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.13	Minimum Detected	-2.04
Maximum Detected	1.4	Maximum Detected	0.336
Mean of Detected	0.412	Mean of Detected	-1.259
SD of Detected	0.487	SD of Detected	0.829
Minimum Non-Detect	1	Minimum Non-Detect	0
Maximum Non-Detect	1	Maximum Non-Detect	0

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.606	Shapiro Wilk Test Statistic	0.801
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.467	Mean	-0.905
SD	0.285	SD	0.556
95% DL/2 (t) UCL	0.592	95% H-Stat (DL/2) UCL	0.639
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-1.421
		SD in Log Scale	0.673
		Mean in Original Scale	0.313
		SD in Original Scale	0.312
		95% t UCL	0.45
		95% Percentile Bootstrap UCL	0.455
		95% BCA Bootstrap UCL	0.525
		95% H-UCL	0.447

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	0.857	Data Distribution Test with Detected Values Only	
Theta Star	0.481	Data appear Lognormal at 5% Significance Level	
nu star	10.28		
A-D Test Statistic	0.915	Nonparametric Statistics	
5% A-D Critical Value	0.708	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.708	Mean	0.288
5% K-S Critical Value	0.338	SD	0.292
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0827
		95% KM (t) UCL	0.433
		95% KM (z) UCL	0.424
		95% KM (jackknife) UCL	0.427
		95% KM (bootstrap t) UCL	0.787
		95% KM (BCA) UCL	0.452
		95% KM (Percentile Bootstrap) UCL	0.433
		95% KM (Chebyshev) UCL	0.649
		97.5% KM (Chebyshev) UCL	0.804
		99% KM (Chebyshev) UCL	1.111
		Potential UCLs to Use	
		95% KM (t) UCL	0.433
		95% KM (% Bootstrap) UCL	0.433
			0.95

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics - Data are in µg/L.

Number of Valid Observations	16	Number of Distinct Observations	16
Raw Statistics	Log-transformed Statistics		
Minimum	1.2	Minimum of Log Data	0.182
Maximum	1580	Maximum of Log Data	7.365
Mean	241.9	Mean of log Data	4.046
Median	101.3	SD of log Data	2.177
SD	398.8		
Std. Error of Mean	99.7		
Coefficient of Variation	1.649		
Skewness	2.866		
Relevant UCL Statistics	Lognormal Distribution Test		
Normal Distribution Test			
Shapiro Wilk Test Statistic	0.624	Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.887	Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution		
95% Student's-t UCL	416.6	95% H-UCL	9122
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1584
95% Adjusted-CLT UCL (Chen-1995)	482.2	97.5% Chebyshev (MVUE) UCL	2087
95% Modified-t UCL (Johnson-1978)	428.5	99% Chebyshev (MVUE) UCL	3075
Gamma Distribution Test	Data Distribution		
k star (bias corrected)	0.406	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	596		
MLE of Mean	241.9		
MLE of Standard Deviation	379.7		
nu star	12.98		
Approximate Chi Square Value (.05)	5.882	Nonparametric Statistics	
Adjusted Level of Significance	0.0335	95% CLT UCL	405.8
Adjusted Chi Square Value	5.347	95% Jackknife UCL	416.6
		95% Standard Bootstrap UCL	403.9
Anderson-Darling Test Statistic	0.252	95% Bootstrap-t UCL	690.3
Anderson-Darling 5% Critical Value	0.807	95% Hall's Bootstrap UCL	1114
Kolmogorov-Smirnov Test Statistic	0.117	95% Percentile Bootstrap UCL	422.3
Kolmogorov-Smirnov 5% Critical Value	0.229	95% BCA Bootstrap UCL	495.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	676.4
		97.5% Chebyshev(Mean, Sd) UCL	864.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1234
95% Approximate Gamma UCL	533.9		
95% Adjusted Gamma UCL	587.4		
Potential UCL to Use		Use 95% Adjusted Gamma UCL	587.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Vanadium

General Statistics - Data are in µg/L.

Number of Valid Data	16 Number of Detected Data	13
Number of Distinct Detected Data	13 Number of Non-Detect Data	3
	Percent Non-Detects	18.75%
Raw Statistics	Log-transformed Statistics	
Minimum Detected	1.4 Minimum Detected	0.336
Maximum Detected	20.5 Maximum Detected	3.02
Mean of Detected	6.862 Mean of Detected	1.721
SD of Detected	4.835 SD of Detected	0.682
Minimum Non-Detect	5 Minimum Non-Detect	1.609
Maximum Non-Detect	5 Maximum Non-Detect	1.609

UCL Statistics

Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.816 Shapiro Wilk Test Statistic	0.966
5% Shapiro Wilk Critical Value	0.866 5% Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	6.044 Mean	1.57
95% DL/2 (t) UCL	4.668 SD	0.691
	8.09 95% H-Stat (DL/2) UCL	9.152

Maximum Likelihood Estimate(MLE) Method

Mean	Log ROS Method	
SD	5.094 Mean in Log Scale	1.573
95% MLE (t) UCL	5.753 SD in Log Scale	0.697
95% MLE (Tiku) UCL	7.615 Mean in Original Scale	6.065
	8.021 SD in Original Scale	4.66
	95% t UCL	8.107
	95% Percentile Bootstrap UCL	8.071
	95% BCA Bootstrap UCL	8.666
	95% H UCL	9.265

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	Data Distribution Test with Detected Values Only	
Theta Star	2.051 Data appear Gamma Distributed at 5% Significance Level	
nu star	3.346	
	53.32	

A-D Test Statistic

5% A-D Critical Value	0.313 Nonparametric Statistics	
K-S Test Statistic	0.741 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.741 Mean	6.081
Data appear Gamma Distributed at 5% Significance Level	0.239 SD	4.509

Assuming Gamma Distribution

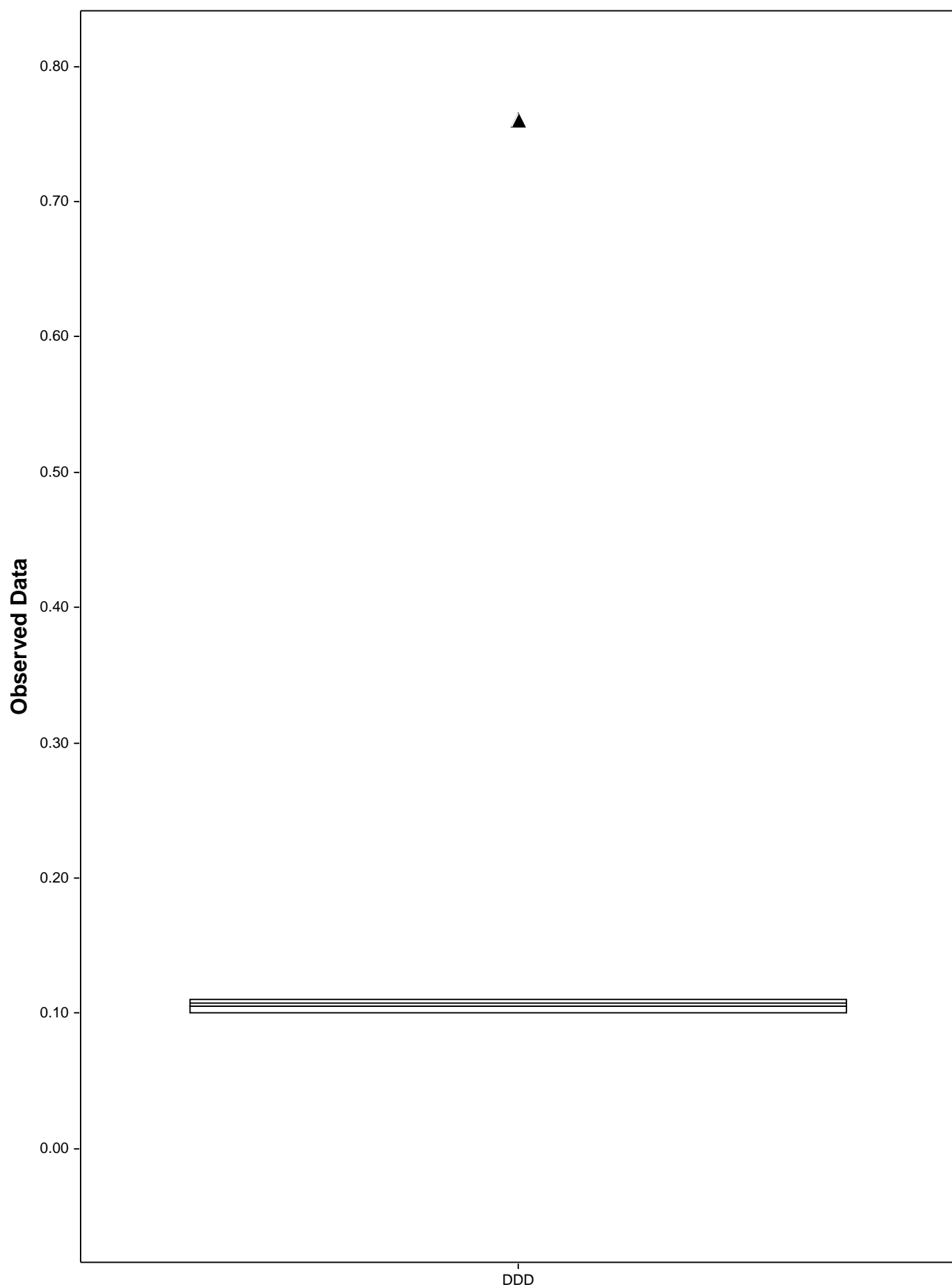
Gamma ROS Statistics using Extrapolated Data	SE of Mean	1.181
Minimum	95% KM (t) UCL	8.152
Maximum	95% KM (z) UCL	8.024
Mean	95% KM (jackknife) UCL	8.146
Median	95% KM (bootstrap t) UCL	9.217
SD	20.5 95% KM (BCA) UCL	8.438
k star	5.969 95% KM (Percentile Bootstrap) UCL	8.002
Theta star	5.55 95% KM (Chebyshev) UCL	11.23
Nu star	4.789 97.5% KM (Chebyshev) UCL	13.46
AppChi2	0.497 99% KM (Chebyshev) UCL	17.83
95% Gamma Approximate UCL	12.01	
95% Adjusted Gamma UCL	15.91 Potential UCLs to Use	
Note: DL/2 is not a recommended method.	7.899 95% KM (BCA) UCL	8.438
	12.02	
	13.08	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL

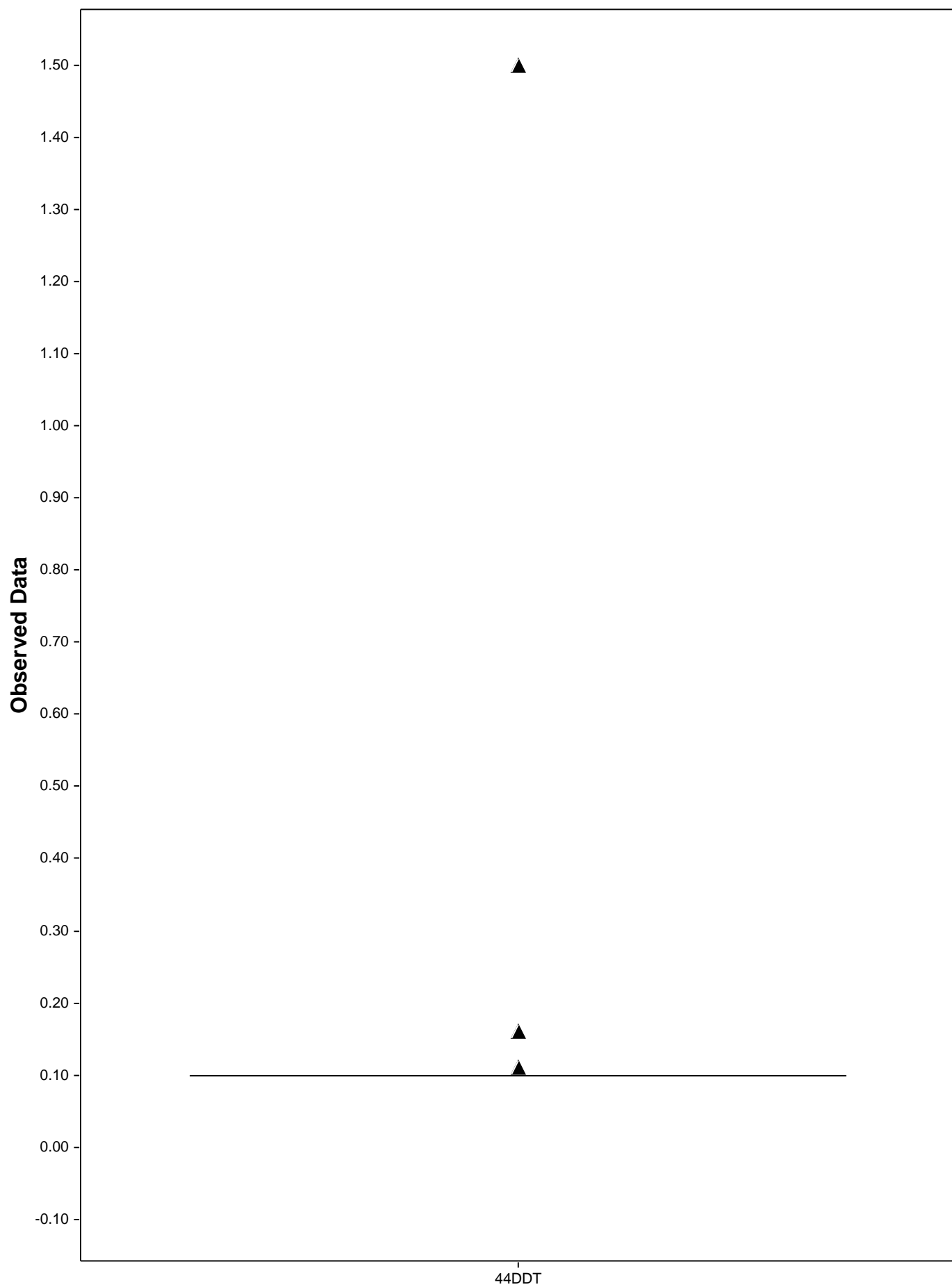
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006)

For additional insight, the user may want to consult a statistician.

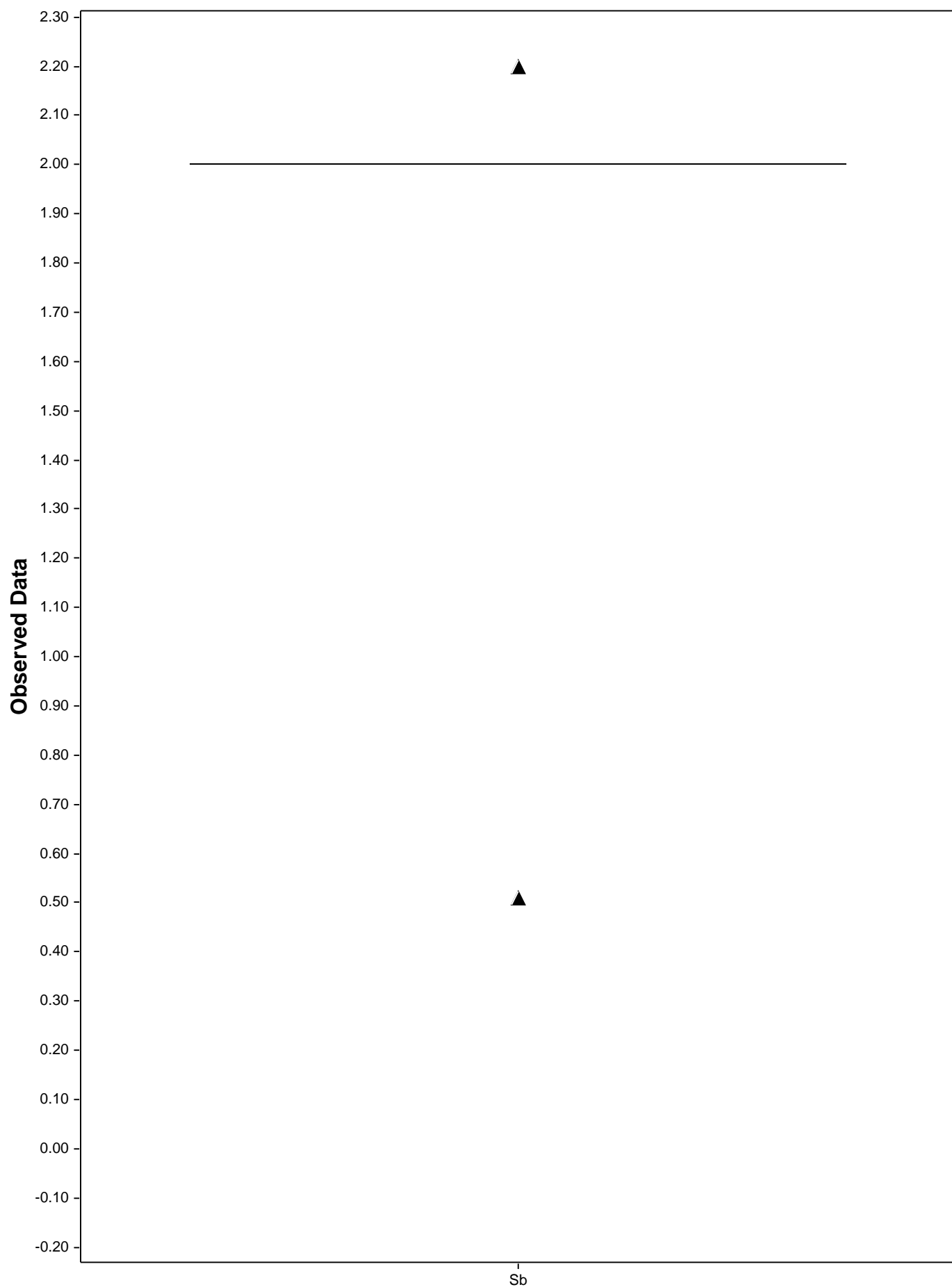
Box Plot for DDD



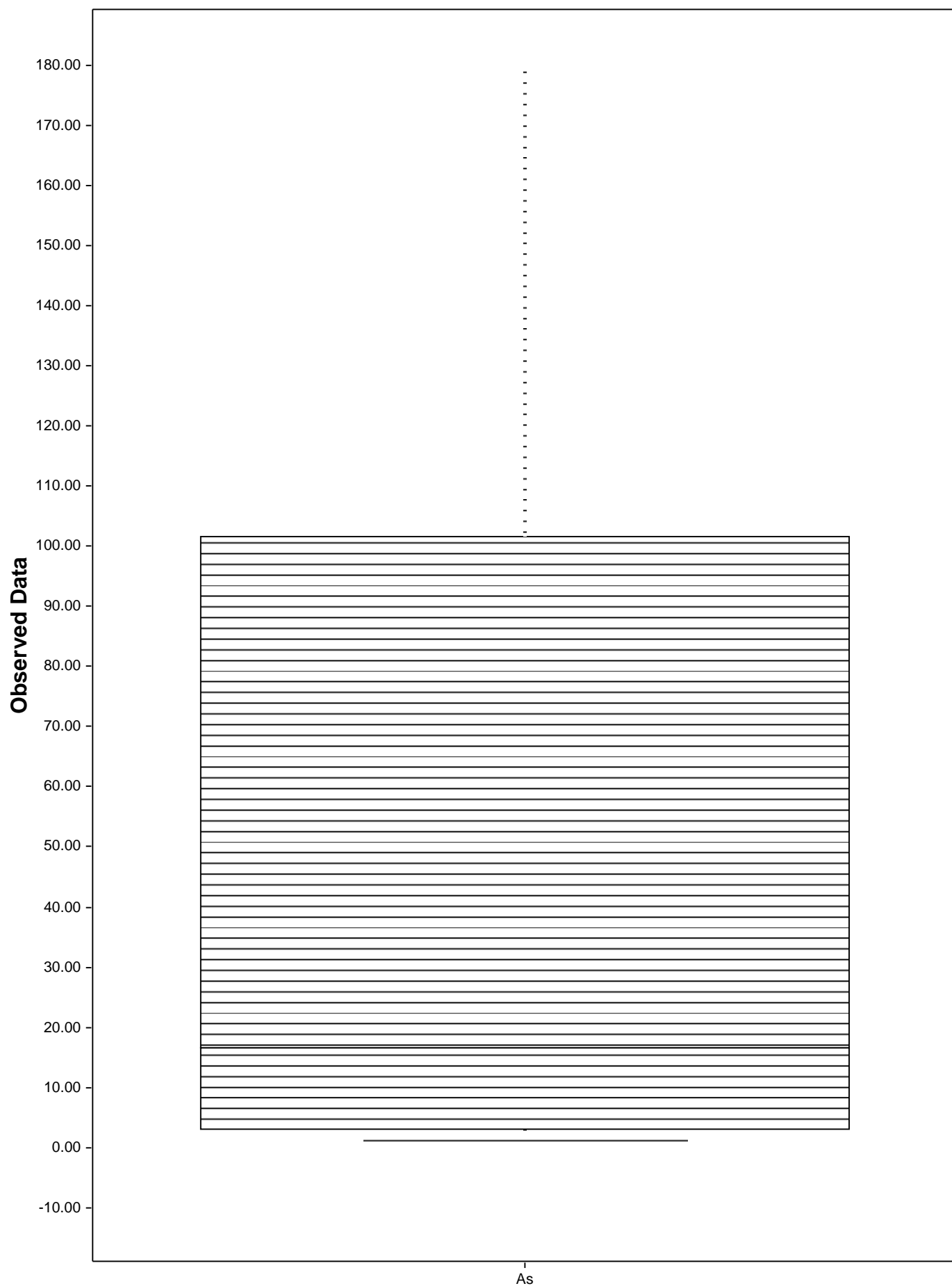
Box Plot for 44DDT



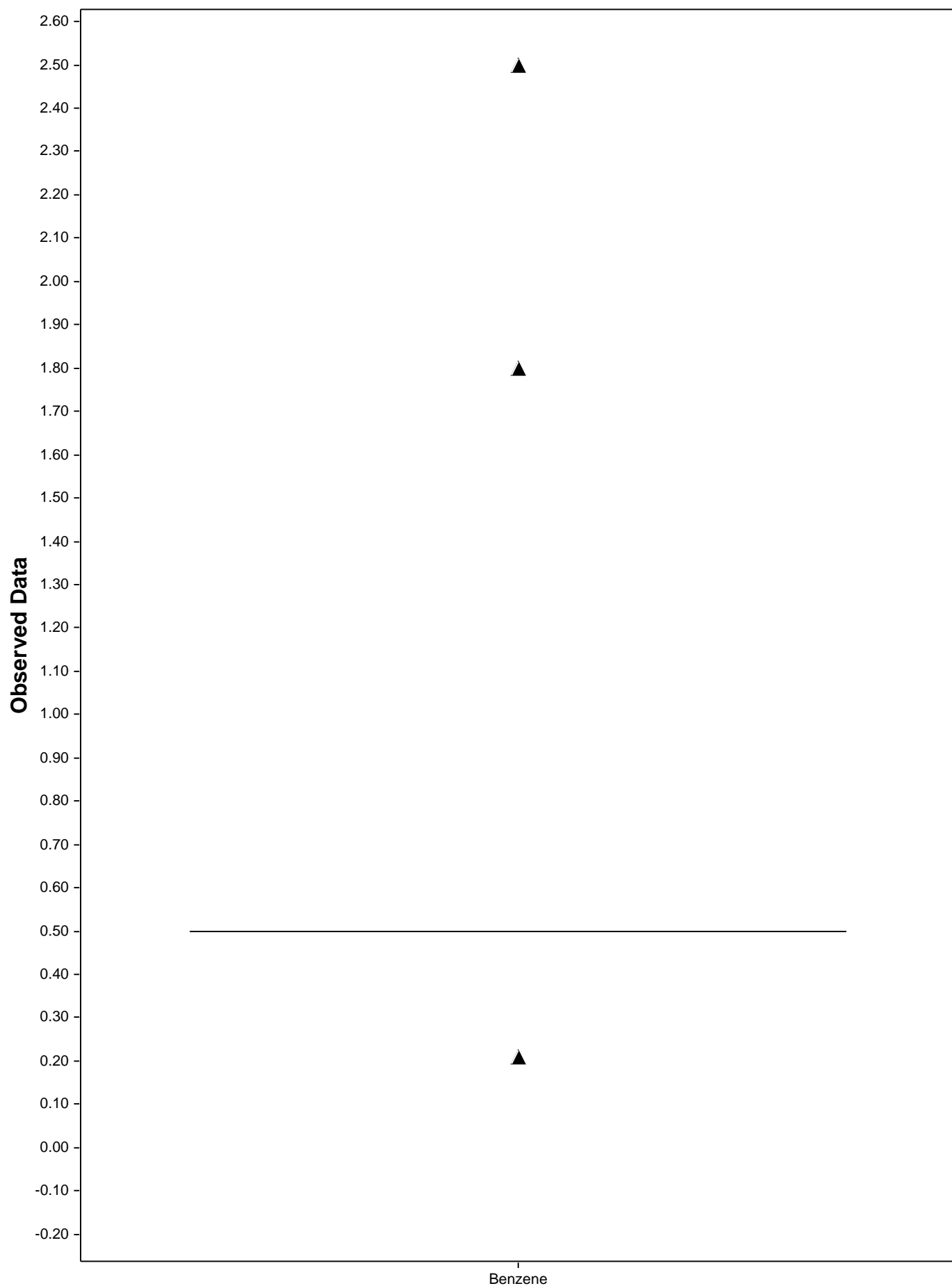
Box Plot for Sb



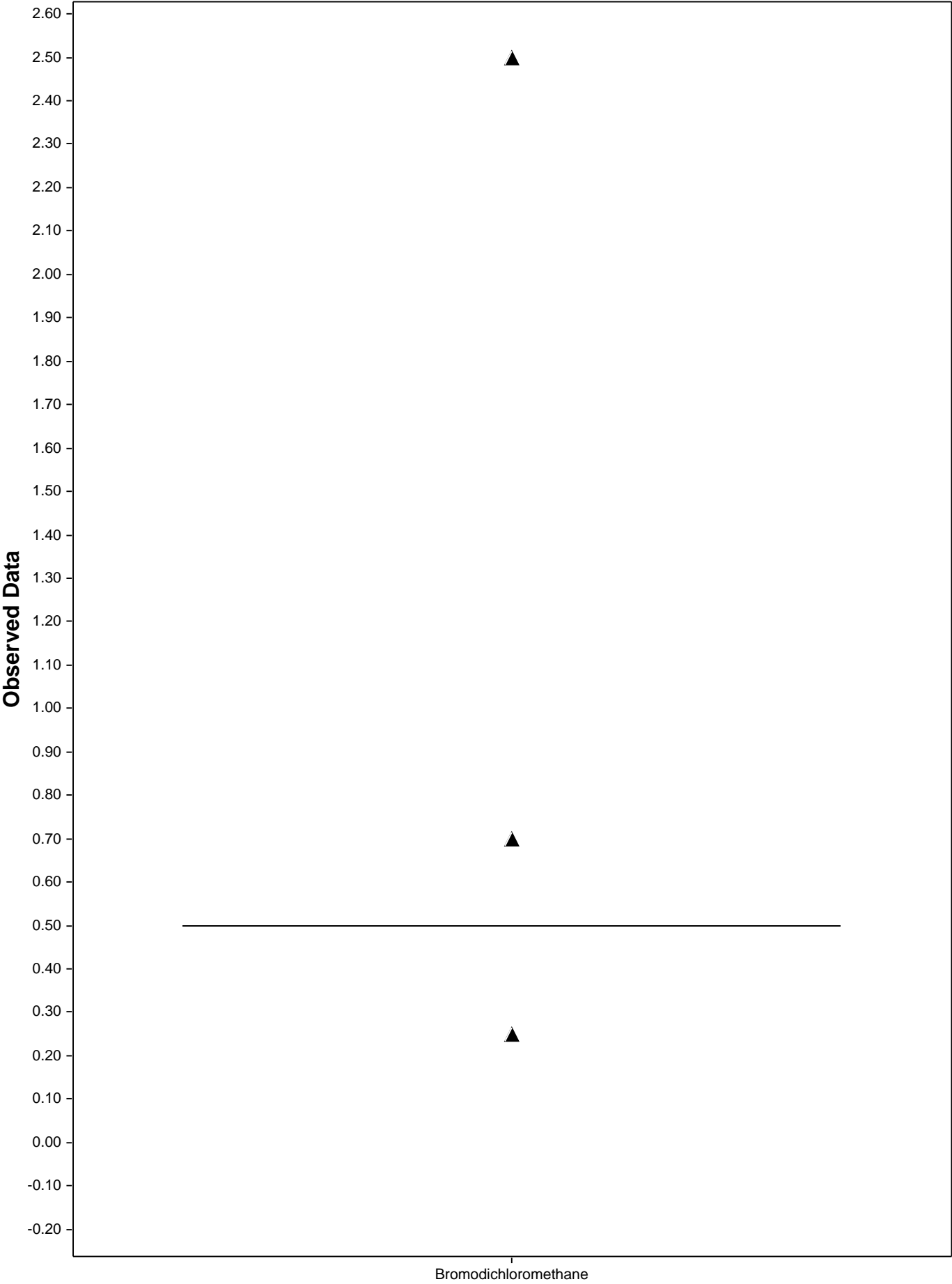
Box Plot for As



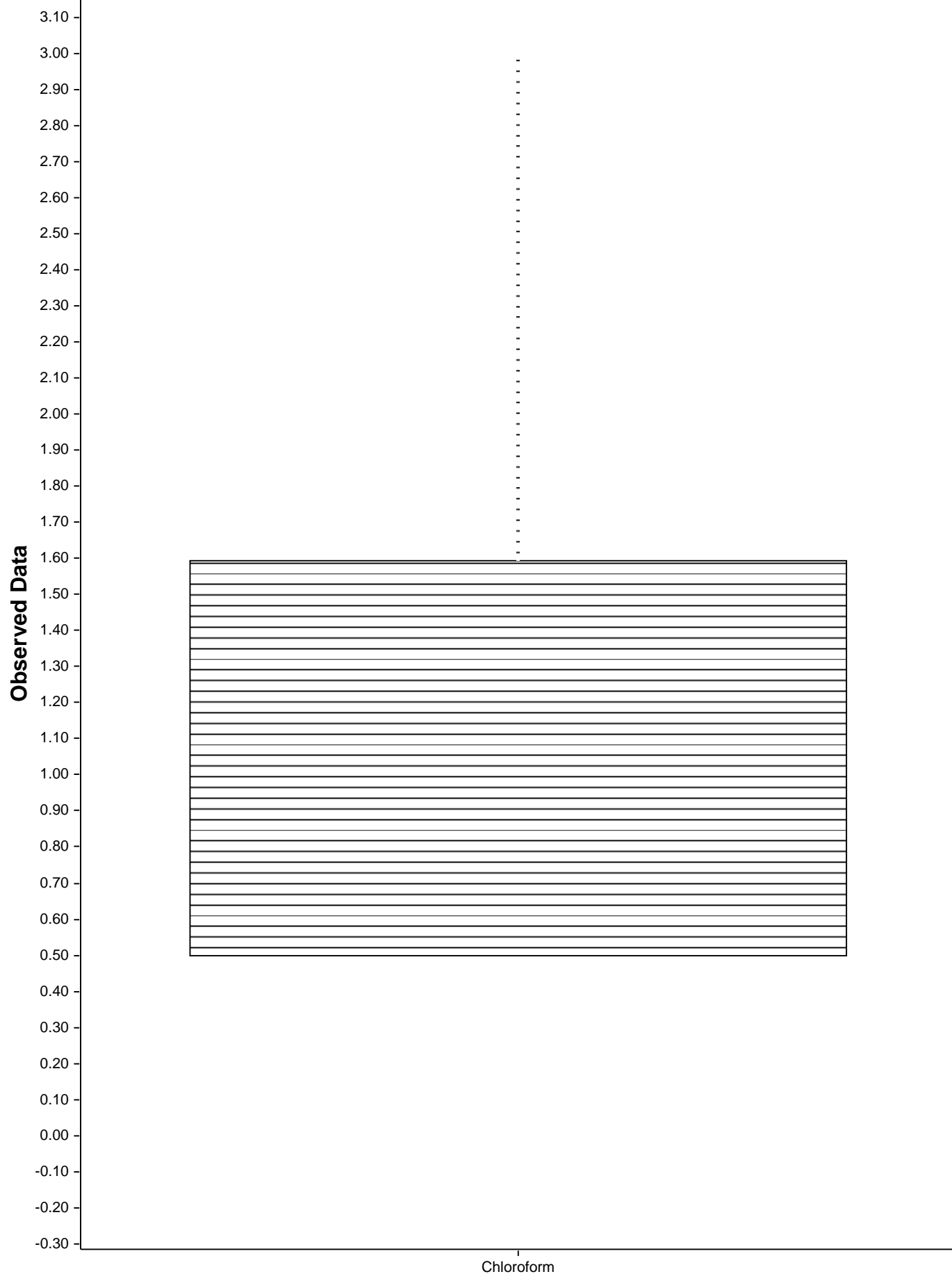
Box Plot for Benzene



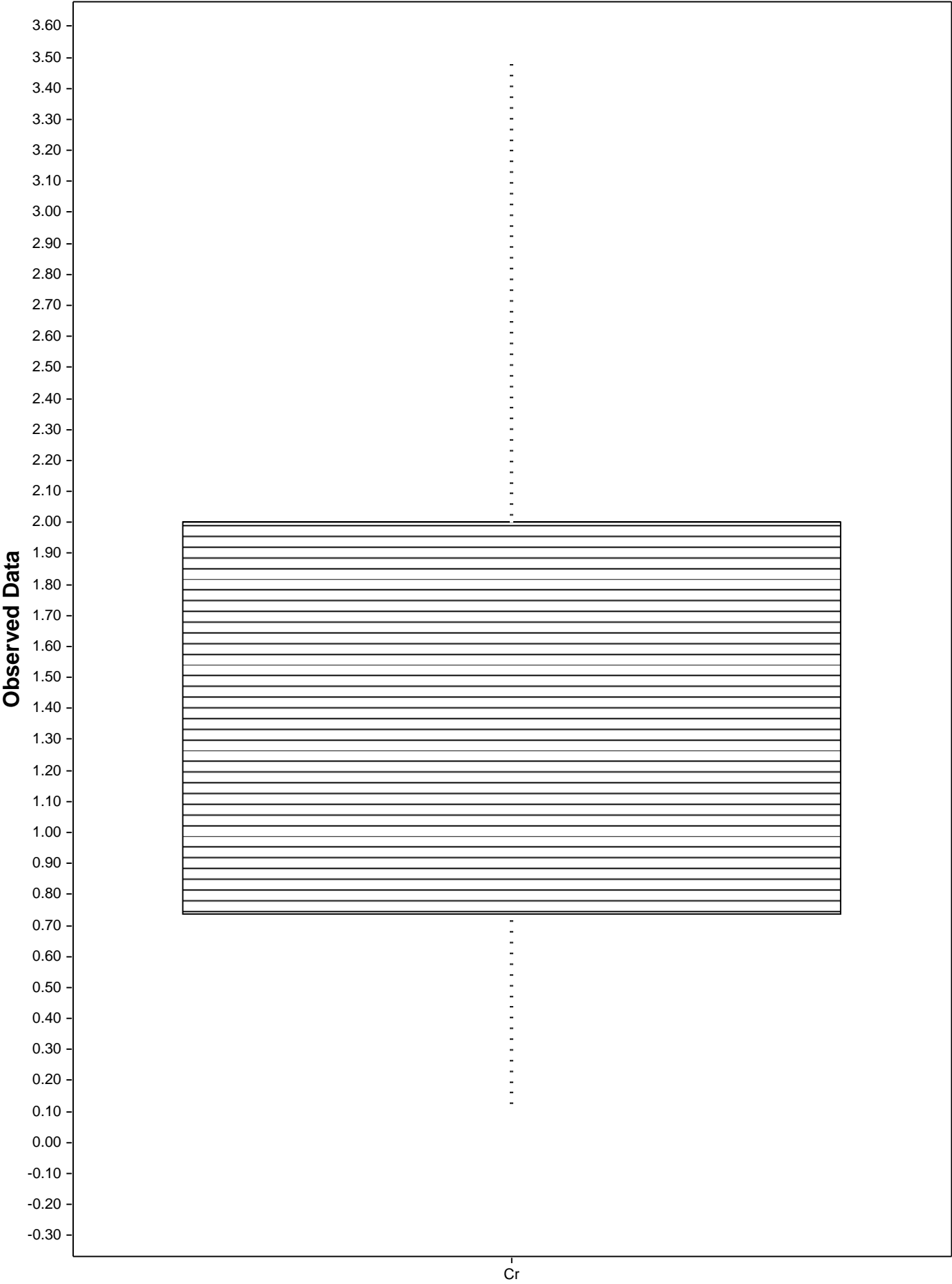
Box Plot for Bromodichloromethane



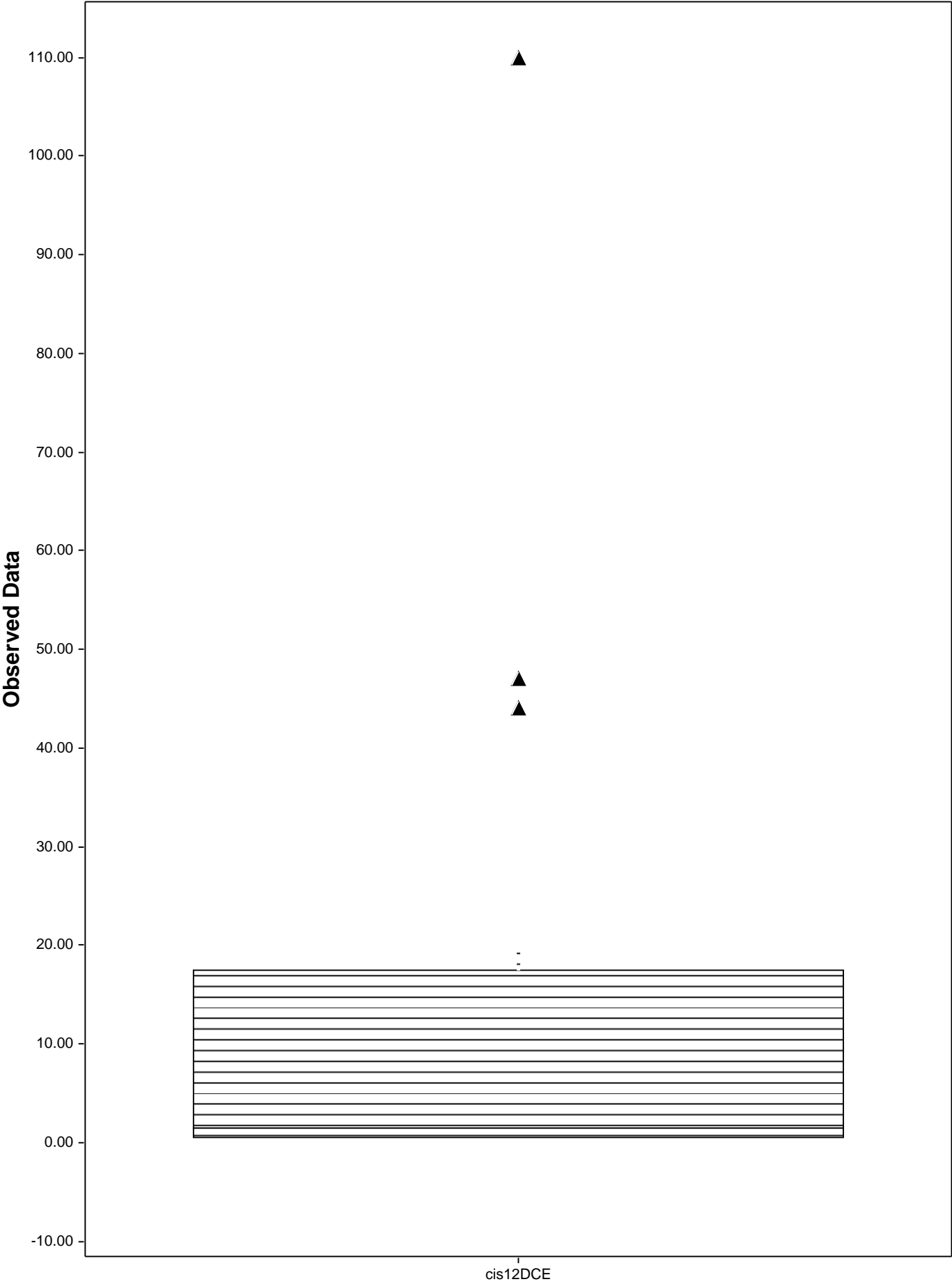
Box Plot for Chloroform



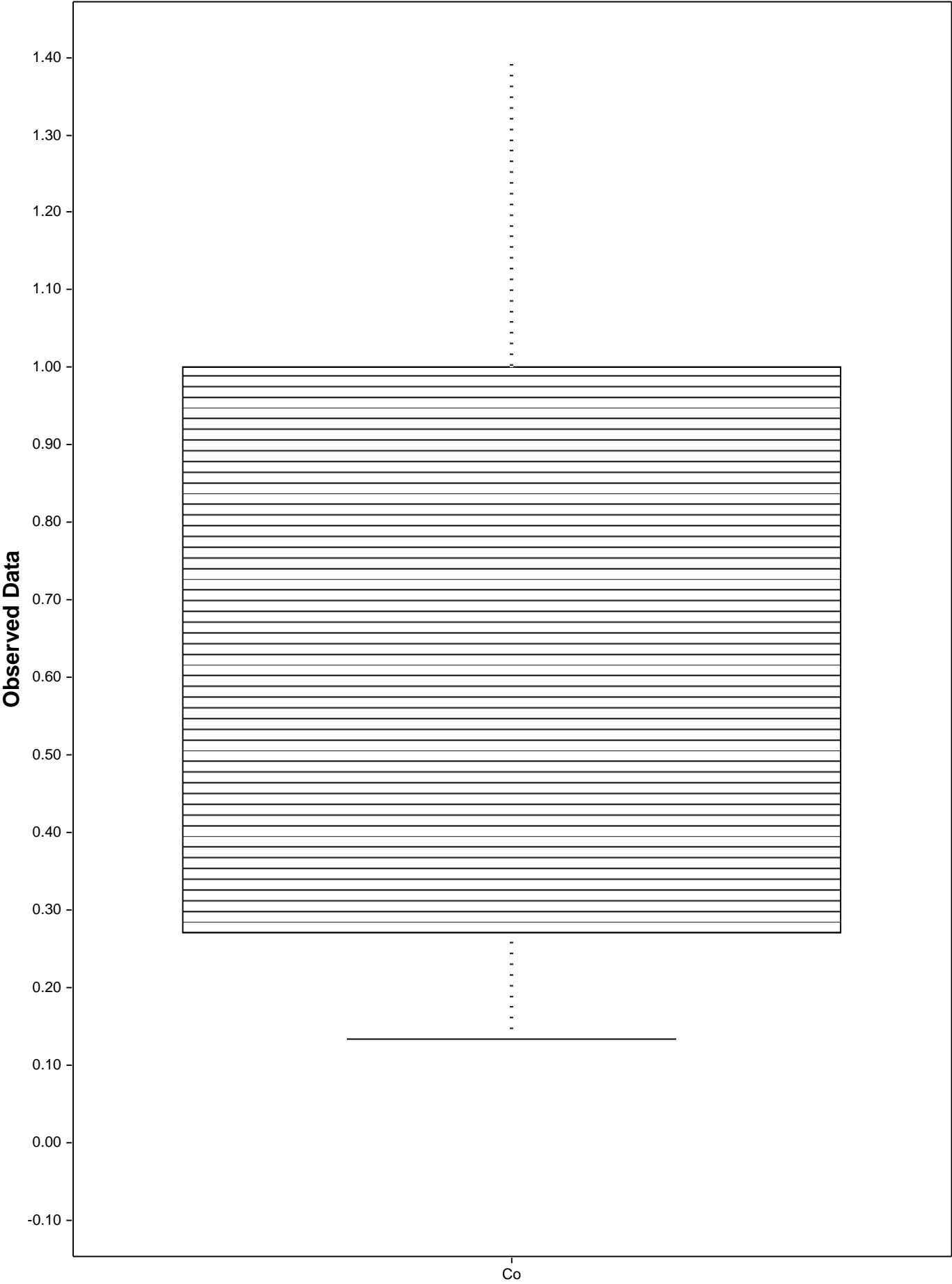
Box Plot for Cr



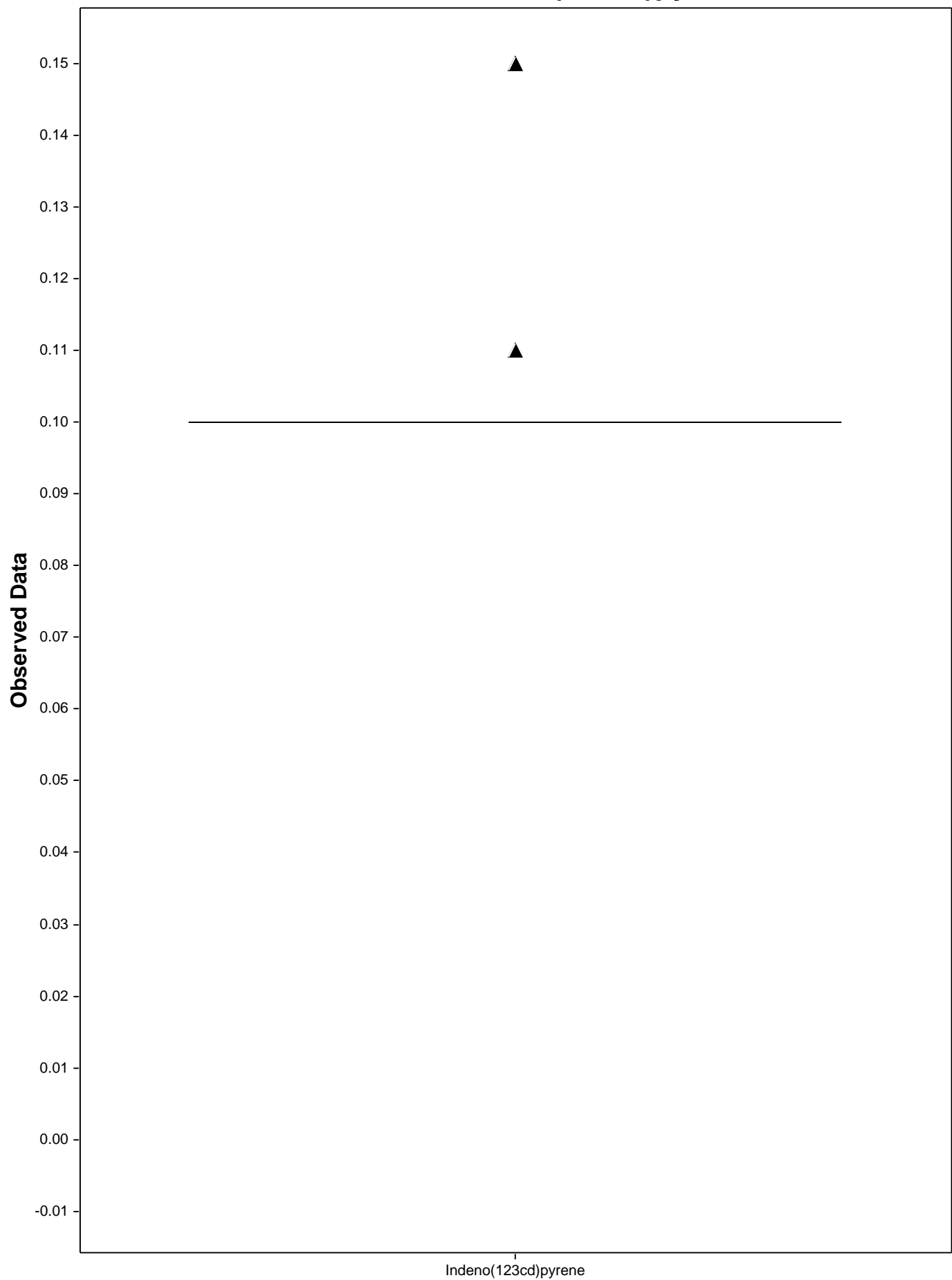
Box Plot for cis12DCE



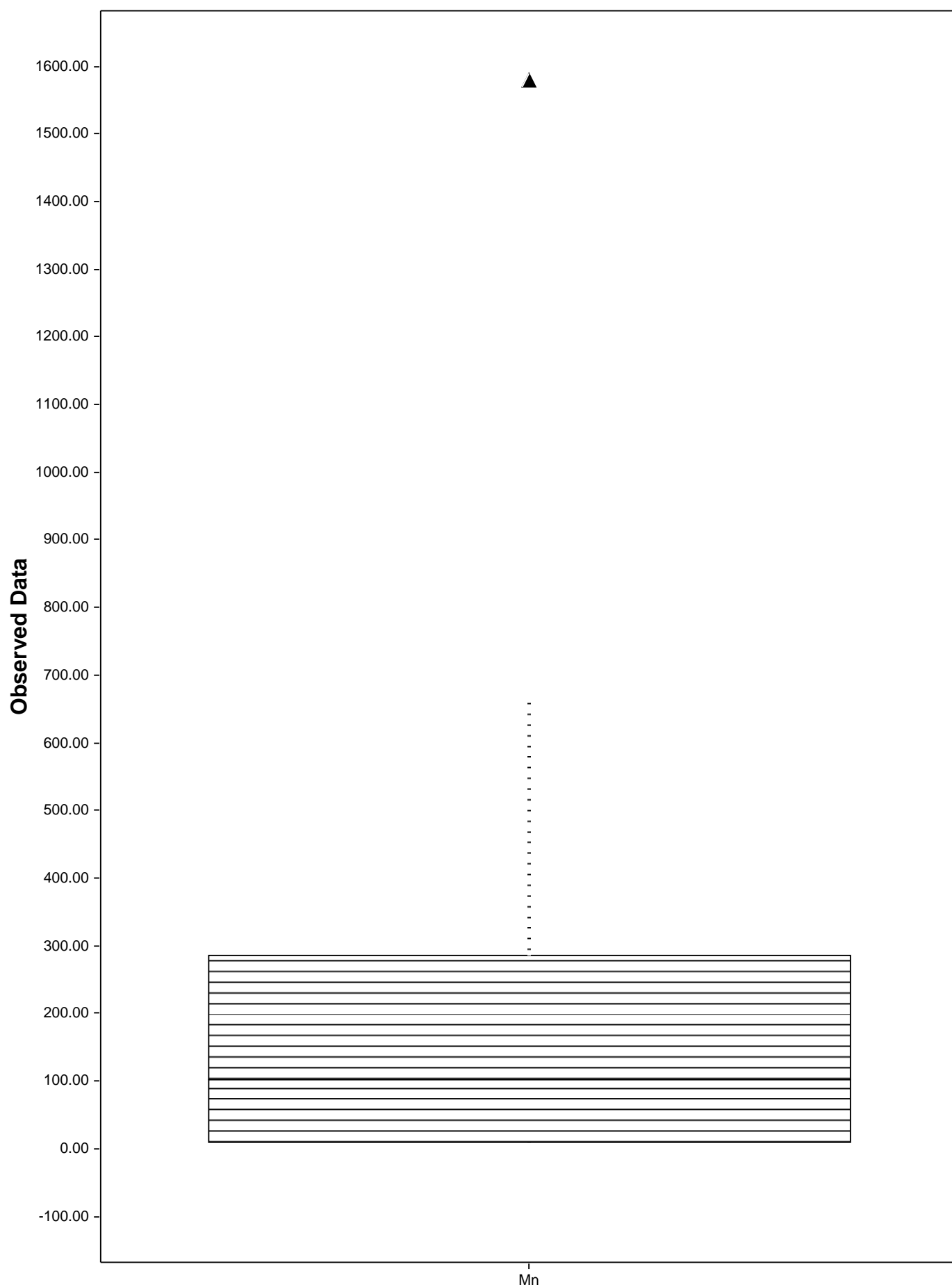
Box Plot for Co



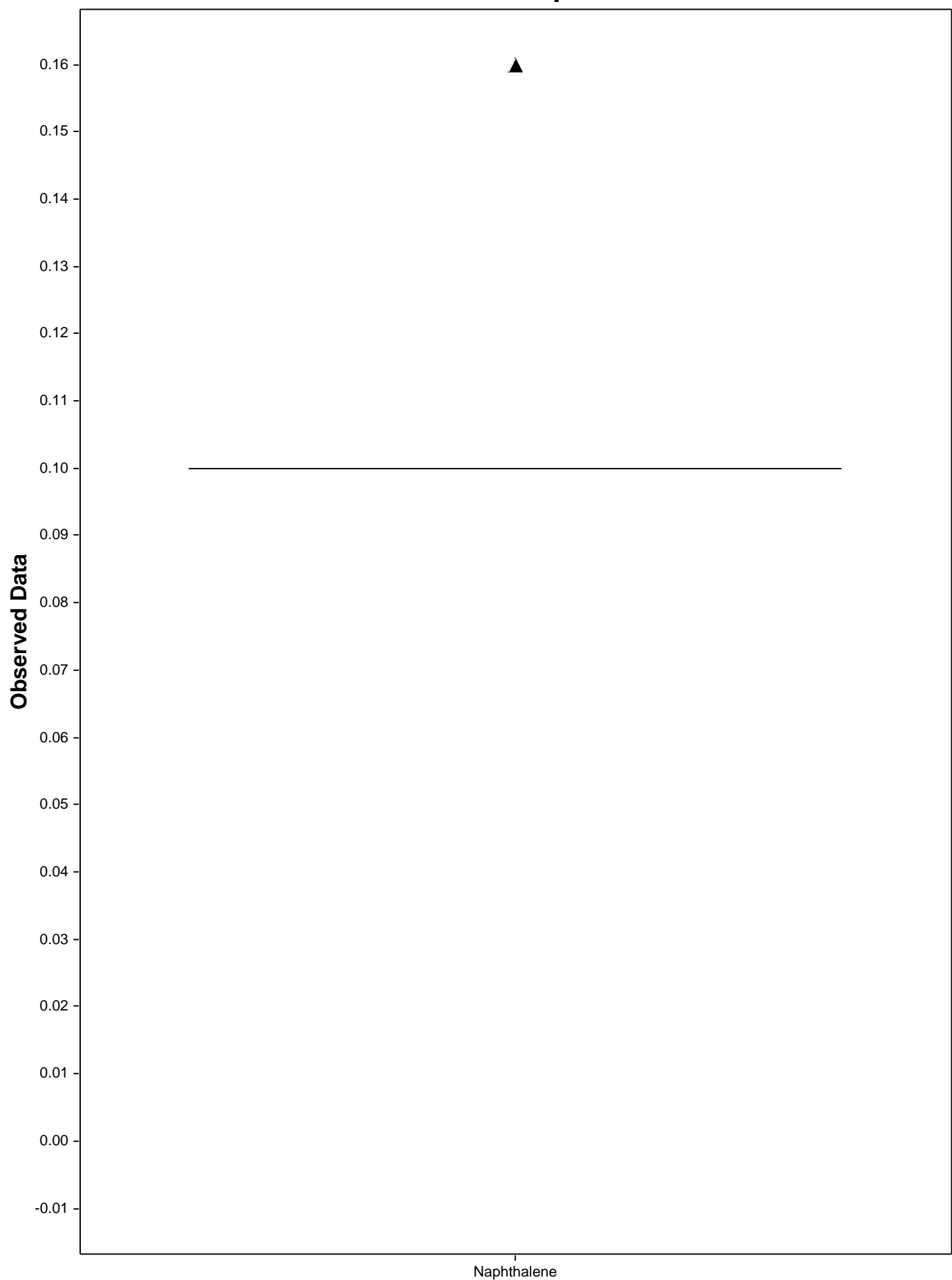
Box Plot for Indeno(123cd)pyrene



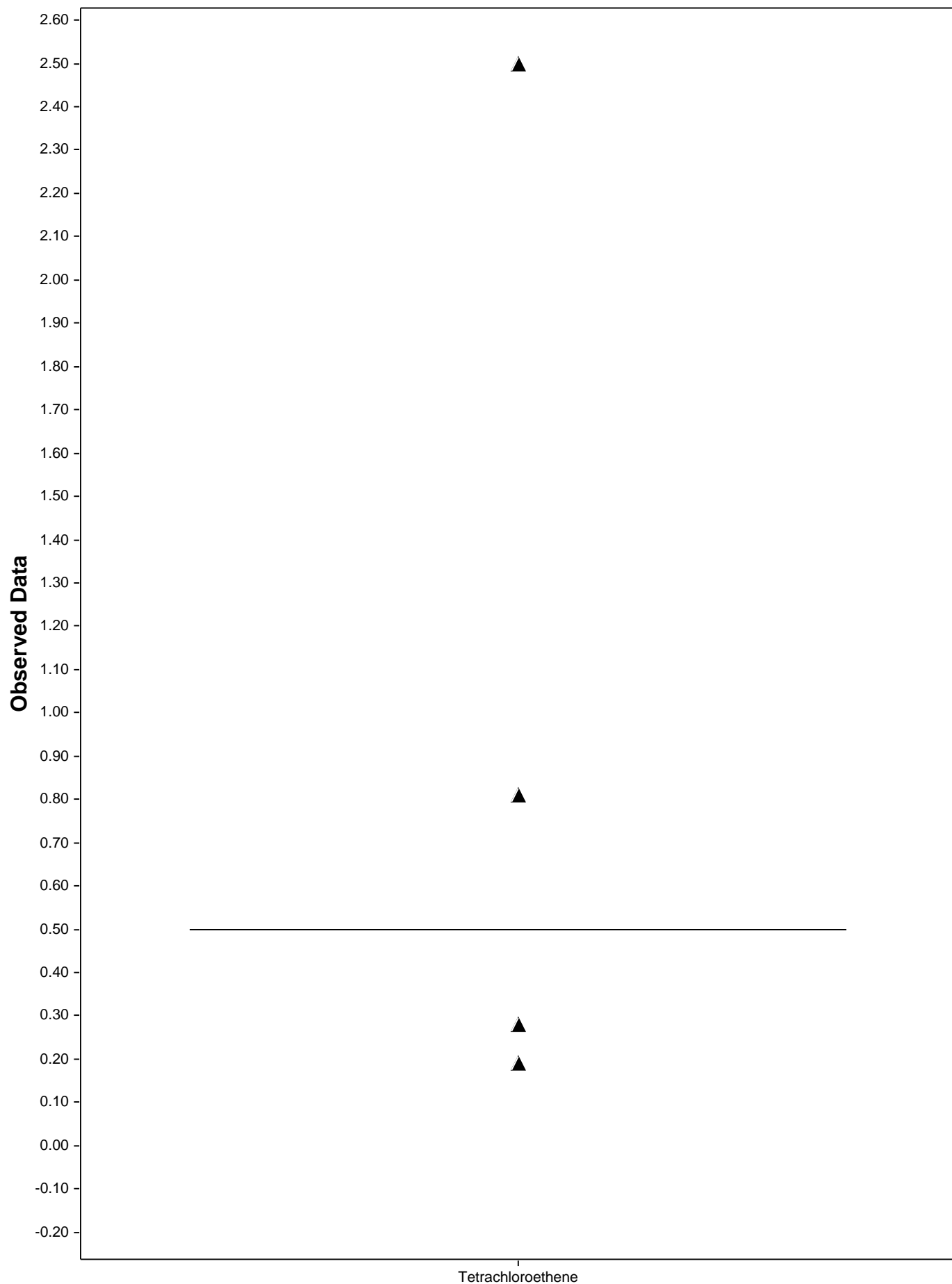
Box Plot for Mn



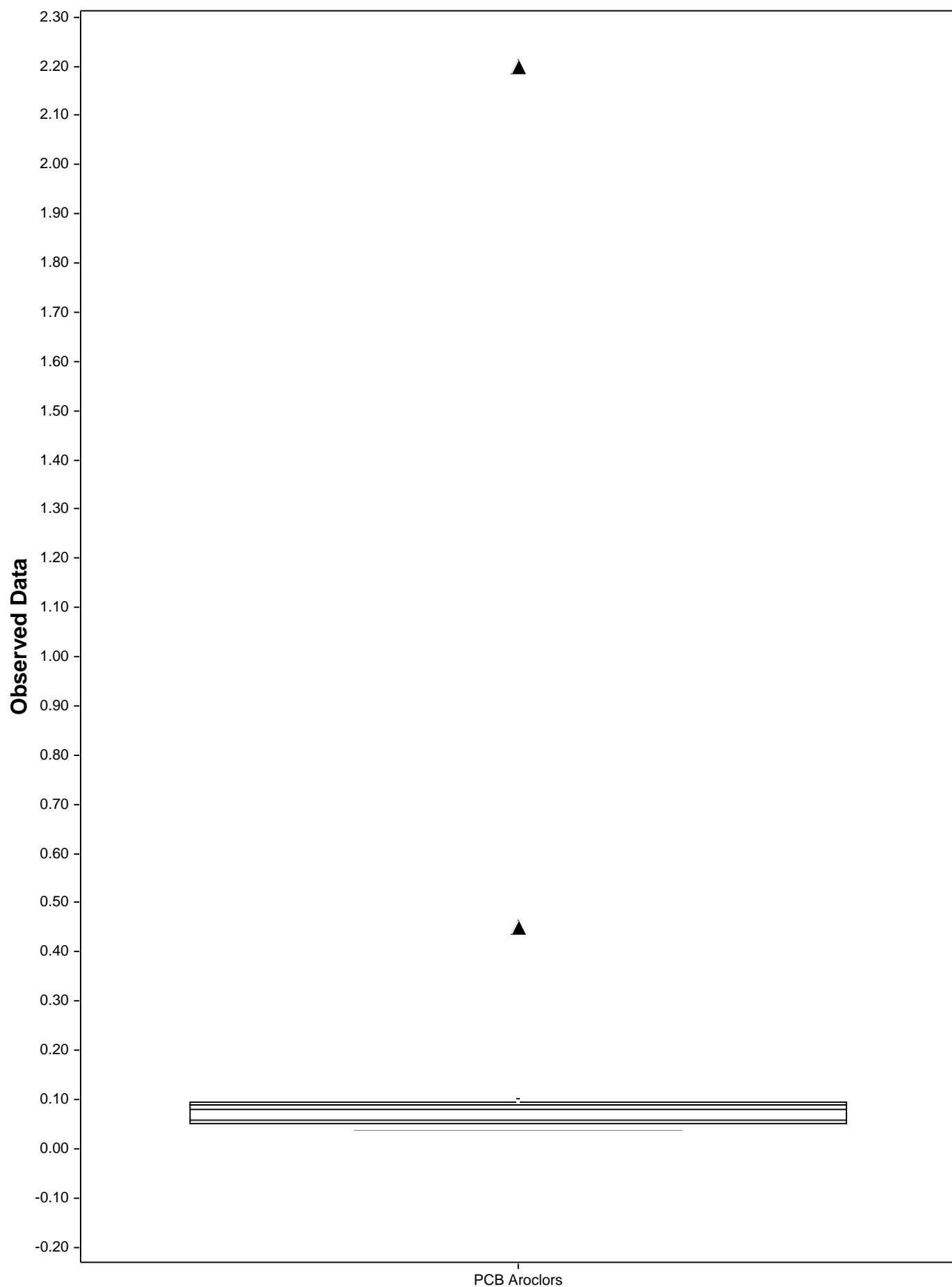
Box Plot for Naphthalene



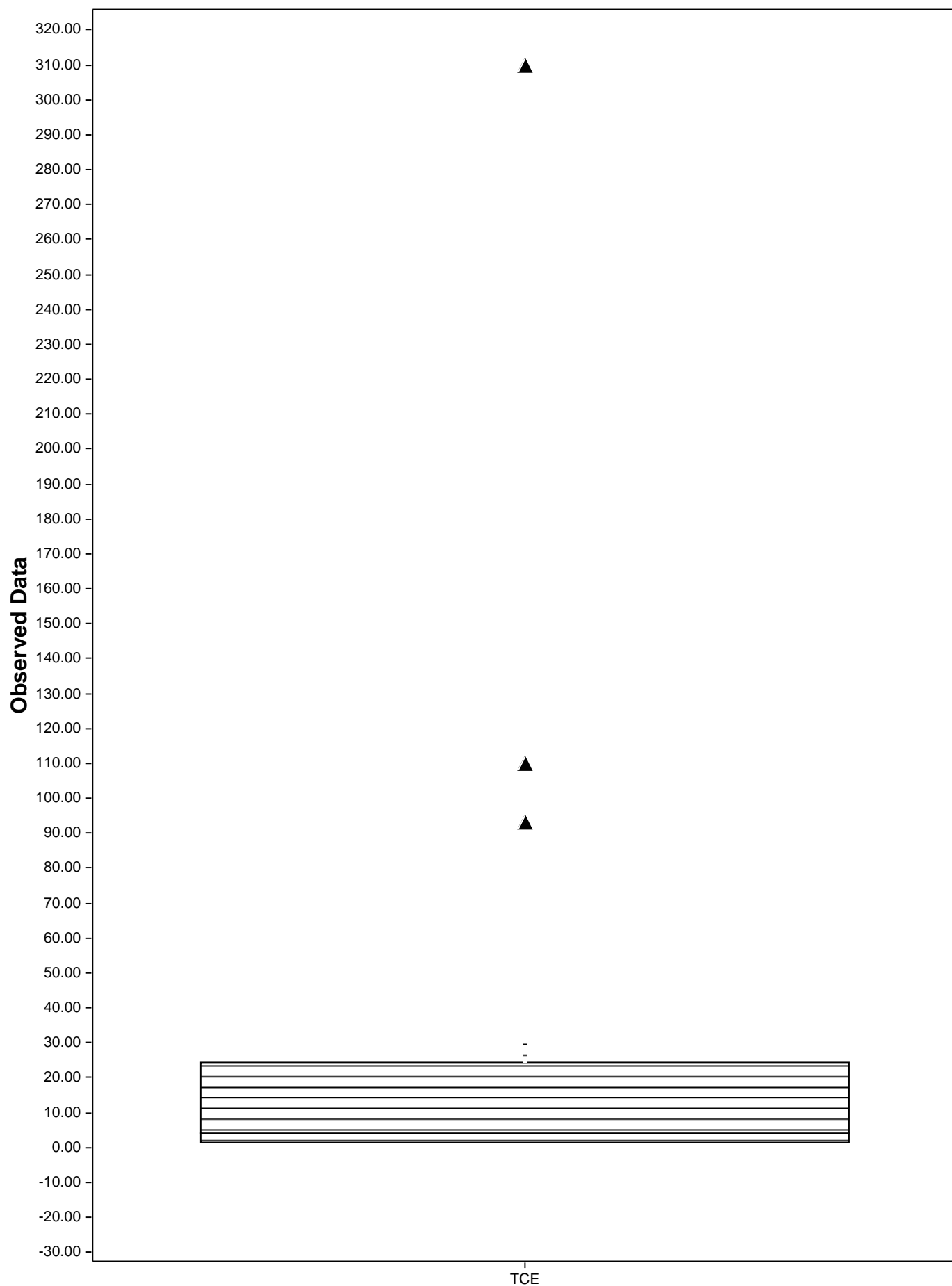
Box Plot for Tetrachloroethene



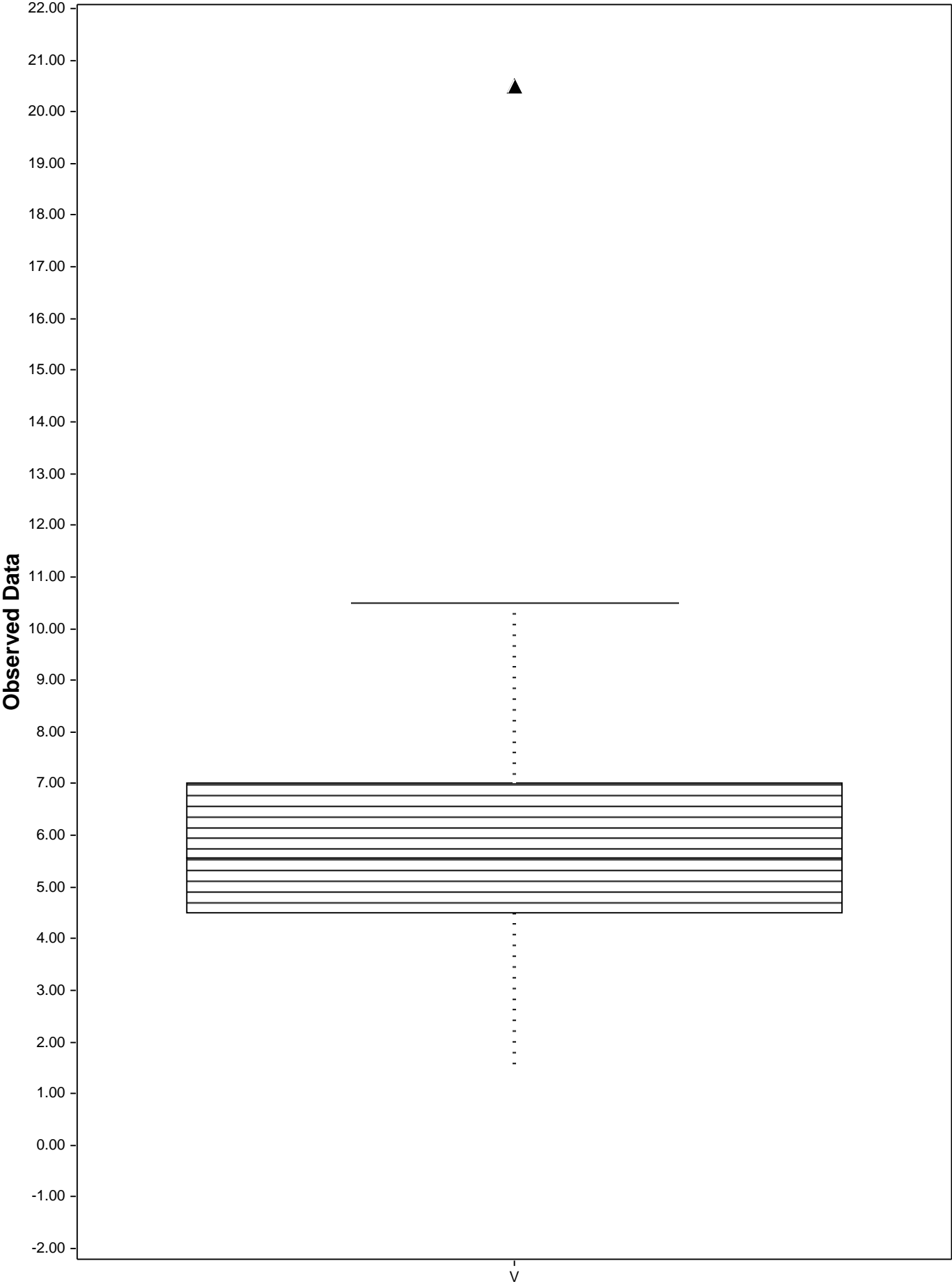
Box Plot for PCB Aroclors



Box Plot for TCE



Box Plot for V



cis-1,2-Dichloroethene

General Statistics (µg/L)

Number of Valid Data	8	Number of Detected Data	4
Number of Distinct Detected Data	4	Number of Non-Detect Data	4
		Percent Non-Detects	50.00%

Raw Statistics

		Log-transformed Statistics	
Minimum Detected	0.36	Minimum Detected	-1.022
Maximum Detected	31	Maximum Detected	3.434
Mean of Detected	14.55	Mean of Detected	1.371
SD of Detected	16.24	SD of Detected	2.307
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5	Maximum Non-Detect	-0.693

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.807	Shapiro Wilk Test Statistic	0.83
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	7.399	Mean	-0.00763
SD	13.09	SD	2.11
95% DL/2 (t) UCL	16.17	95% H-Stat (DL/2) UCL	1574

Maximum Likelihood Estimate(MLE) Method

N/A		Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-0.0809
		SD in Log Scale	2.325
		Mean in Original Scale	7.455
		SD in Original Scale	13.06
		95% t UCL	16.2
		95% Percentile Bootstrap UCL	15.08
		95% BCA Bootstrap UCL	17.57

Gamma Distribution Test with Detected Values Only

		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.289	Data appear Normal at 5% Significance Level	
Theta Star	50.39		
nu star	2.309		

A-D Test Statistic

	0.539	Nonparametric Statistics	
5% A-D Critical Value	0.682	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.682	Mean	7.454
5% K-S Critical Value	0.411	SD	12.22
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	4.987

Assuming Gamma Distribution

		95% KM (t) UCL	16.9
		95% KM (z) UCL	15.66
		95% KM (jackknife) UCL	16.07
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	13.17
Minimum	0.36	95% KM (BCA) UCL	27.25
Maximum	62.84	95% KM (Percentile Bootstrap) UCL	26.63
Mean	20.37	95% KM (Chebyshev) UCL	29.19
Median	18.09	97.5% KM (Chebyshev) UCL	38.6
SD	21.02	99% KM (Chebyshev) UCL	57.08
k star	0.505	Potential UCLs to Use	
Theta star	40.35	95% KM (t) UCL	16.9
Nu star	8.076	95% KM (Percentile Bootstrap) UCL	26.63
AppChi2	2.779		
95% Gamma Approximate UCL	59.18		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Methyl tert butyl ether

General Statistics (µg/L)		
Number of Valid Data	8 Number of Detected Data	4
Number of Distinct Detected Data	4 Number of Non-Detect Data	4
	Percent Non-Detects	50.00%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.54 Minimum Detected	-0.616
Maximum Detected	330 Maximum Detected	5.799
Mean of Detected	162.9 Mean of Detected	2.783
SD of Detected	187.2 SD of Detected	3.48
Minimum Non-Detect	0.5 Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5 Maximum Non-Detect	-0.693

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.745	Shapiro Wilk Test Statistic	0.787
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value	0.748
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	81.59	Mean	0.699
SD	150.3	SD	3.187
95% DL/2 (t) UCL	182.2	95% H-Stat (DL/2) UCL	31929975
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-2.354
		SD in Log Scale	6.29
		Mean in Original Scale	81.47
		SD in Original Scale	150.3
		95% t UCL	182.2
		95% Percentile Bootstrap UCL	163.8
		95% BCA Bootstrap UCL	202.7

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.241	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	675.1		
nu star	1.931		

A-D Test Statistic	0.647	Nonparametric Statistics	
5% A-D Critical Value	0.704	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.704	Mean	81.74
5% K-S Critical Value	0.418	SD	140.5
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	57.35
		95% KM (t) UCL	190.4
		95% KM (z) UCL	176.1
		95% KM (jackknife) UCL	182.1
Assuming Gamma Distribution		95% KM (bootstrap t) UCL	138.3
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL	322.5
Minimum	0.54	95% KM (Percentile Bootstrap) UCL	321.3
Maximum	377.3	95% KM (Chebyshev) UCL	331.7
Mean	162.9	97.5% KM (Chebyshev) UCL	439.9
Median	110.7	99% KM (Chebyshev) UCL	652.3
SD	156.7		
k star	0.389	Potential UCLs to Use	
Theta star	419.1		
Nu star	6.22	95% KM (t) UCL	190.4
AppChi2	1.753		
95% Gamma Approximate UCL	578		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Trichloroethene

General Statistics (µg/L)

Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%

Raw Statistics

		Log-transformed Statistics	
Minimum Detected	620	Minimum Detected	6.43
Maximum Detected	1800	Maximum Detected	7.496
Mean of Detected	1210	Mean of Detected	6.963
SD of Detected	834.4	SD of Detected	0.754
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5	Maximum Non-Detect	-0.693

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	302.7	Mean	0.701
SD	642.7	SD	3.875
95% DL/2 (t) UCL	733.2	95% H-Stat (DL/2) UCL	8.24E+10

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly	N/A	Log ROS Method	
		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only	
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)	
nu star	N/A		

A-D Test Statistic

5% A-D Critical Value	N/A	Nonparametric Statistics	
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method	
5% K-S Critical Value	N/A	Mean	767.5
Data not Gamma Distributed at 5% Significance Level		SD	390.2
		SE of Mean	195.1
		95% KM (t) UCL	1137
		95% KM (z) UCL	1088

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	N/A
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	1618
SD	N/A	97.5% KM (Chebyshev) UCL	1986
k star	N/A	99% KM (Chebyshev) UCL	2709
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	1137
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

Naphthalene

General Statistics (µg/L)

Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%

Raw Statistics

		Log-transformed Statistics	
Minimum Detected	0.084	Minimum Detected	-2.477
Maximum Detected	0.18	Maximum Detected	-1.715
Mean of Detected	0.132	Mean of Detected	-2.096
SD of Detected	0.0679	SD of Detected	0.539
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1	Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0705	Mean	-2.771
SD	0.0458	SD	0.464
95% DL/2 (t) UCL	0.101	95% H-Stat (DL/2) UCL	0.104

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly	N/A	Log ROS Method	
		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only	
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)	
nu star	N/A		

A-D Test Statistic

5% A-D Critical Value	N/A	Nonparametric Statistics	
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method	
5% K-S Critical Value	N/A	Mean	0.096
		SD	0.0317
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.0159
		95% KM (t) UCL	0.126
		95% KM (z) UCL	0.122

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	N/A
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	N/A
Mean	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Median	N/A	95% KM (Chebyshev) UCL	0.165
SD	N/A	97.5% KM (Chebyshev) UCL	0.195
k star	N/A	99% KM (Chebyshev) UCL	0.254
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.126
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

Arsenic

General Statistics (µg/L)

Number of Valid Observations	8	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	0.85	Minimum of Log Data	-0.163
Maximum	68.8	Maximum of Log Data	4.231
Mean	13.49	Mean of log Data	1.805
Median	6.1	SD of log Data	1.277
SD	22.61		
Coefficient of Variation	1.675		
Skewness	2.702		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.562	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	28.64	95% H-UCL	101.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	35.52
95% Adjusted-CLT UCL (Chen-1995)	34.8	97.5% Chebyshev (MVUE) UCL	45.76
95% Modified-t UCL (Johnson-1978)	29.91	99% Chebyshev (MVUE) UCL	65.9

Gamma Distribution Test

k star (bias corrected)	0.553	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	24.42		
MLE of Mean	13.49		
MLE of Standard Deviation	18.15		
nu star	8.843		
Approximate Chi Square Value (.05)	3.232	Nonparametric Statistics	
Adjusted Level of Significance	0.0195	95% CLT UCL	26.64
Adjusted Chi Square Value	2.436	95% Jackknife UCL	28.64
		95% Standard Bootstrap UCL	25.56
Anderson-Darling Test Statistic	0.667	95% Bootstrap-t UCL	97.58
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	97.81
Kolmogorov-Smirnov Test Statistic	0.282	95% Percentile Bootstrap UCL	28.37
Kolmogorov-Smirnov 5% Critical Value	0.304	95% BCA Bootstrap UCL	36.96
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	48.34
		97.5% Chebyshev(Mean, Sd) UCL	63.41
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	93.03
95% Approximate Gamma UCL	36.92		
95% Adjusted Gamma UCL	48.98		

Potential UCL to Use	Use 95% Approximate Gamma UCL	36.92
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Barium

General Statistics (µg/L)

Number of Valid Observations	8	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	158	Minimum of Log Data	5.063
Maximum	8790	Maximum of Log Data	9.081
Mean	2609	Mean of log Data	6.921
Median	858.5	SD of log Data	1.495
SD	3687		
Coefficient of Variation	1.413		
Skewness	1.416		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.643	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	5079	95% H-UCL	44707
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	8195
95% Adjusted-CLT UCL (Chen-1995)	5451	97.5% Chebyshev (MVUE) UCL	10672
95% Modified-t UCL (Johnson-1978)	5188	99% Chebyshev (MVUE) UCL	15539

Gamma Distribution Test

k star (bias corrected)	0.487	Data Distribution	
Theta Star	5356	Data appear Lognormal at 5% Significance Level	
MLE of Mean	2609		
MLE of Standard Deviation	3738		
nu star	7.795		
Approximate Chi Square Value (.05)	2.617	Nonparametric Statistics	
Adjusted Level of Significance	0.0195	95% CLT UCL	4753
Adjusted Chi Square Value	1.922	95% Jackknife UCL	5079
		95% Standard Bootstrap UCL	4623
Anderson-Darling Test Statistic	0.863	95% Bootstrap-t UCL	24339
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	38899
Kolmogorov-Smirnov Test Statistic	0.362	95% Percentile Bootstrap UCL	4658
Kolmogorov-Smirnov 5% Critical Value	0.306	95% BCA Bootstrap UCL	4840
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8292
		97.5% Chebyshev(Mean, Sd) UCL	10750
		99% Chebyshev(Mean, Sd) UCL	15580
Assuming Gamma Distribution			
95% Approximate Gamma UCL	7772		
95% Adjusted Gamma UCL	10583		

Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL	8292
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Chromium

General Statistics (µg/L)			
Number of Valid Data	8	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	6
		Percent Non-Detects	75.00%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.45	Minimum Detected	-0.799
Maximum Detected	0.57	Maximum Detected	-0.562
Mean of Detected	0.51	Mean of Detected	-0.68
SD of Detected	0.0849	SD of Detected	0.167
Minimum Non-Detect	2	Minimum Non-Detect	0.693
Maximum Non-Detect	4	Maximum Non-Detect	1.386
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.
This may not be adequate enough to compute meaningful and reliable test statistics and estimates.
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTv).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	1.003	Mean	-0.0834
SD	0.461	SD	0.444
95% DL/2 (t) UCL	1.311	95% H-Stat (DL/2) UCL	1.483
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic		Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	0.51
5% K-S Critical Value	N/A	SD	0.06
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.06
		95% KM (t) UCL	0.624
Assuming Gamma Distribution		95% KM (z) UCL	0.609
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.66
Minimum	N/A	95% KM (bootstrap t) UCL	N/A
Maximum	N/A	95% KM (BCA) UCL	0.57
Mean	N/A	95% KM (Percentile Bootstrap) UCL	0.57
Median	N/A	95% KM (Chebyshev) UCL	0.772
SD	N/A	97.5% KM (Chebyshev) UCL	0.885
k star	N/A	99% KM (Chebyshev) UCL	1.107
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	0.624
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	0.57
95% Adjusted Gamma UCL	N/A		

Warning: Recommended UCL exceeds the maximum observation
Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Manganese

General Statistics (µg/L)

Number of Valid Observations	8	Number of Distinct Observations	8
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Raw Statistics

		Log-transformed Statistics	
Minimum	34.9	Minimum of Log Data	3.552
Maximum	484	Maximum of Log Data	6.182
Mean	213	Mean of log Data	5.045
Median	154	SD of log Data	0.909
SD	165.8		
Coefficient of Variation	0.778		
Skewness	0.794		

Warning: There are only 8 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.896	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.818	Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution

95% Student's-t UCL	324.1	95% H-UCL	706.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	534.2
95% Adjusted-CLT UCL (Chen-1995)	327	97.5% Chebyshev (MVUE) UCL	670.3
95% Modified-t UCL (Johnson-1978)	326.8	99% Chebyshev (MVUE) UCL	937.5

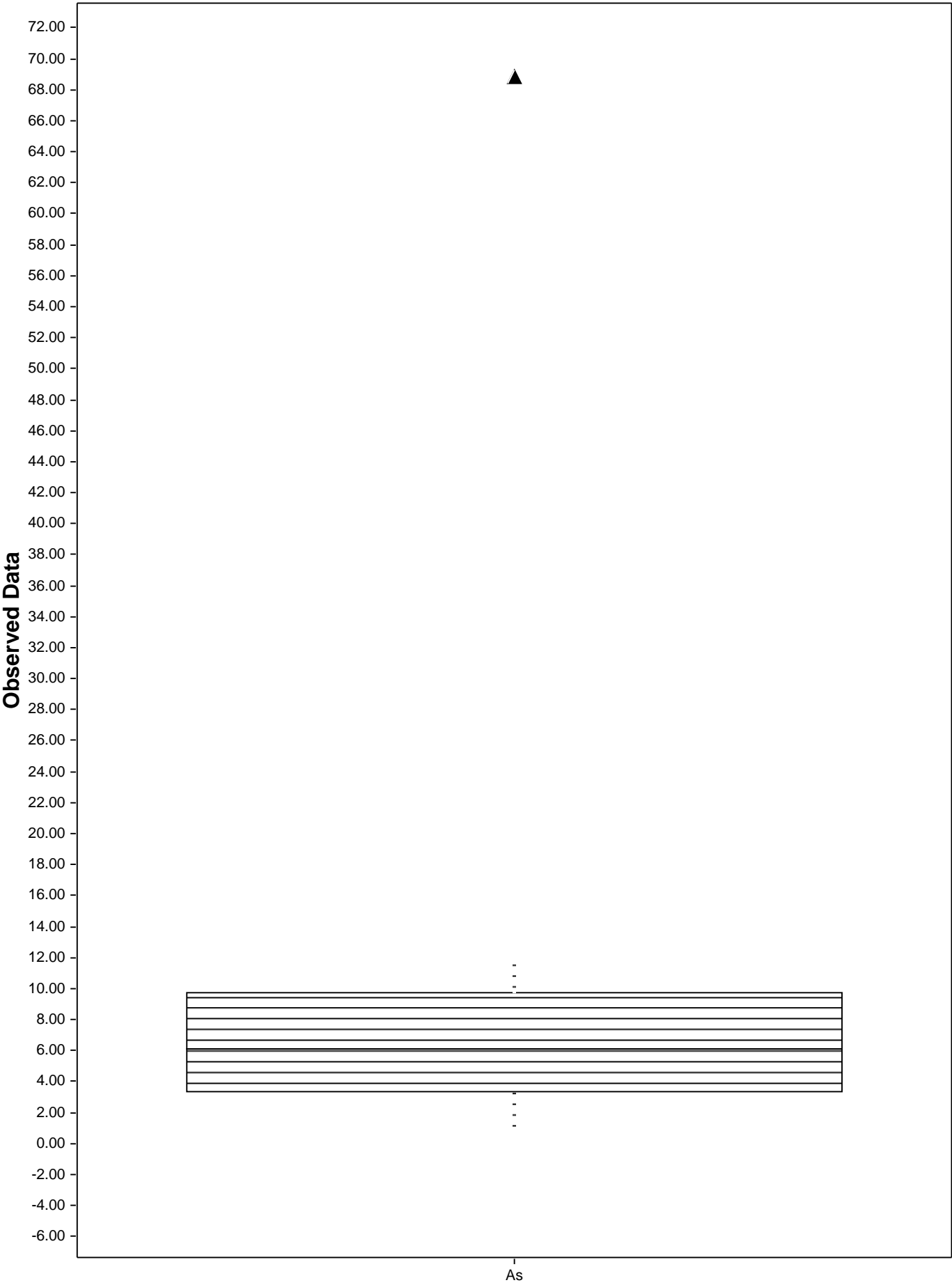
Gamma Distribution Test

k star (bias corrected)	1.163	Data Distribution	
Theta Star	183.2	Data appear Normal at 5% Significance Level	
MLE of Mean	213		
MLE of Standard Deviation	197.6		
nu star	18.6		
Approximate Chi Square Value (.05)	9.826	Nonparametric Statistics	
Adjusted Level of Significance	0.0195	95% CLT UCL	309.4
Adjusted Chi Square Value	8.263	95% Jackknife UCL	324.1
		95% Standard Bootstrap UCL	303.2
Anderson-Darling Test Statistic	0.209	95% Bootstrap-t UCL	391.9
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	361
Kolmogorov-Smirnov Test Statistic	0.147	95% Percentile Bootstrap UCL	305.9
Kolmogorov-Smirnov 5% Critical Value	0.298	95% BCA Bootstrap UCL	315
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	468.5
		97.5% Chebyshev(Mean, Sd) UCL	579
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	796.1
95% Approximate Gamma UCL	403.2		
95% Adjusted Gamma UCL	479.5		

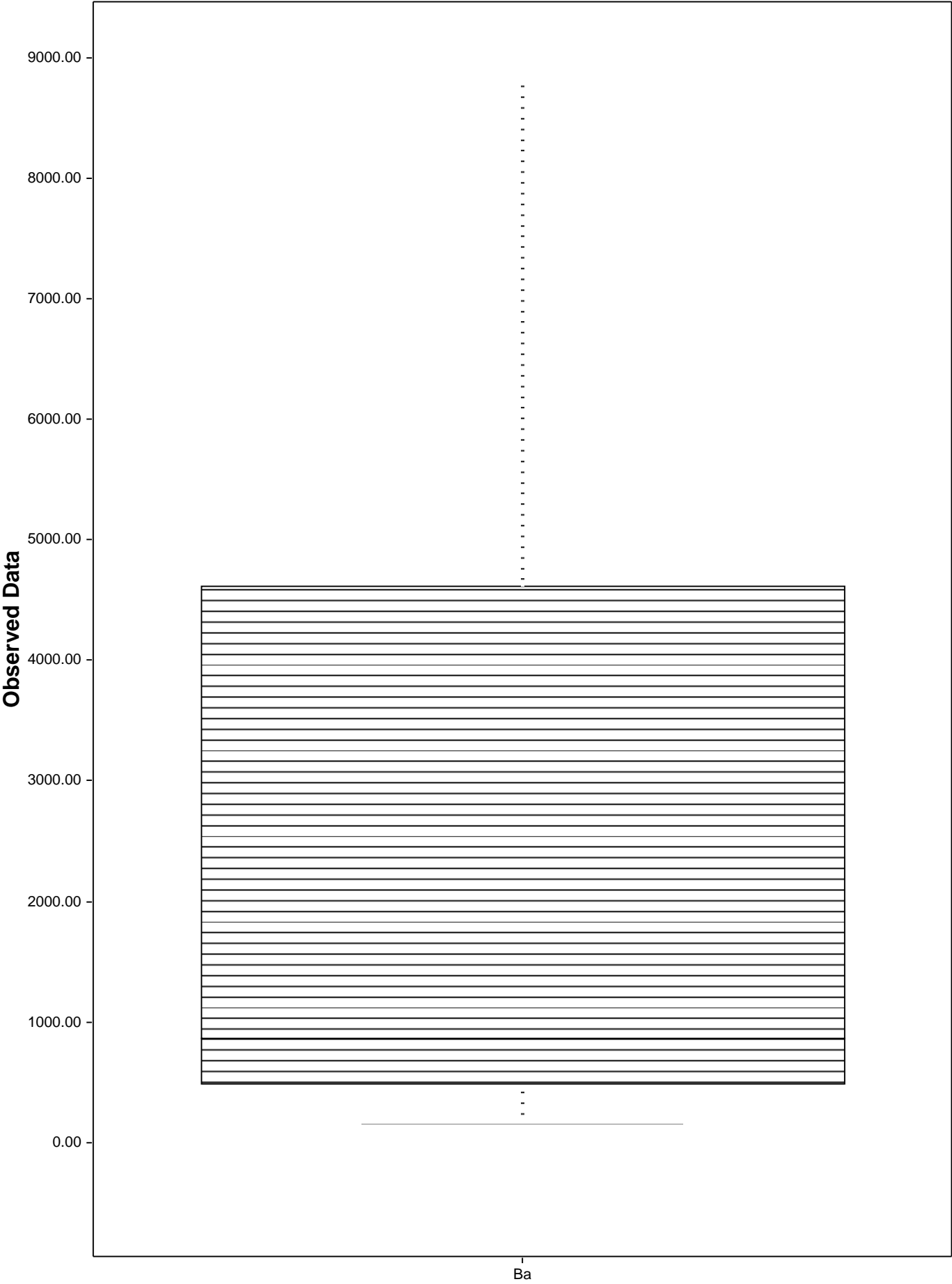
Potential UCL to Use	Use 95% Student's-t UCL	324.1
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Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

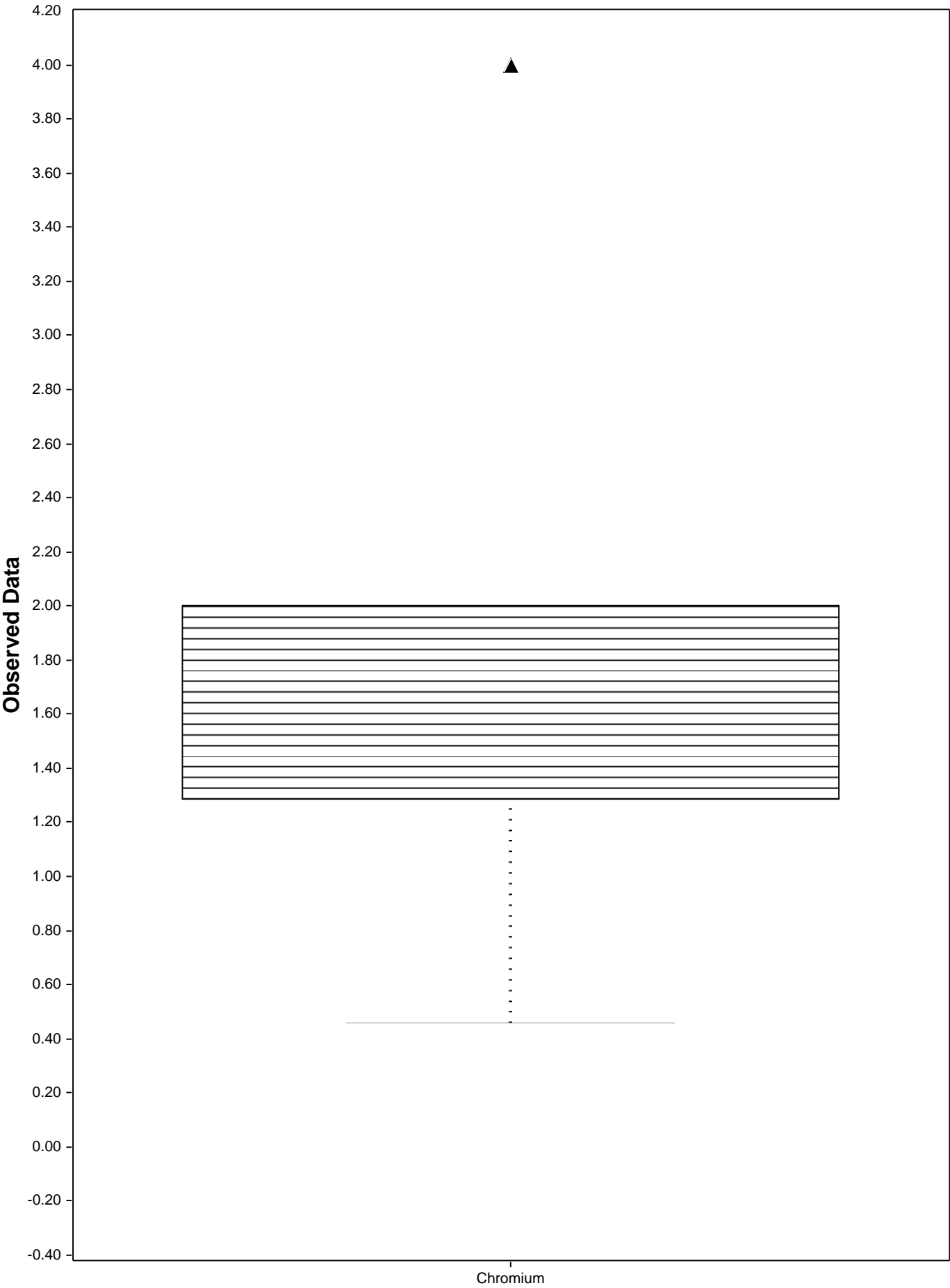
Box Plot for As



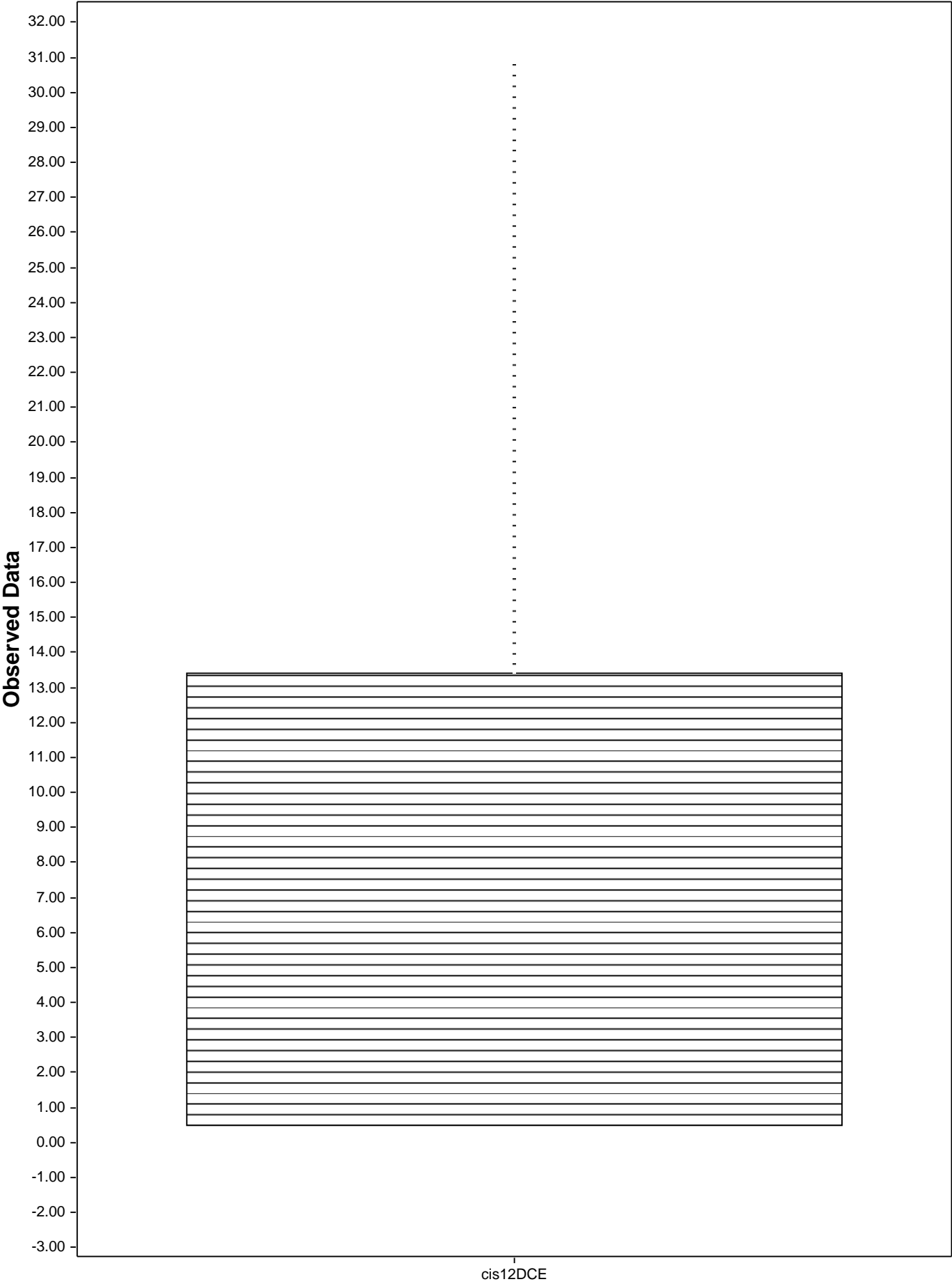
Box Plot for Ba



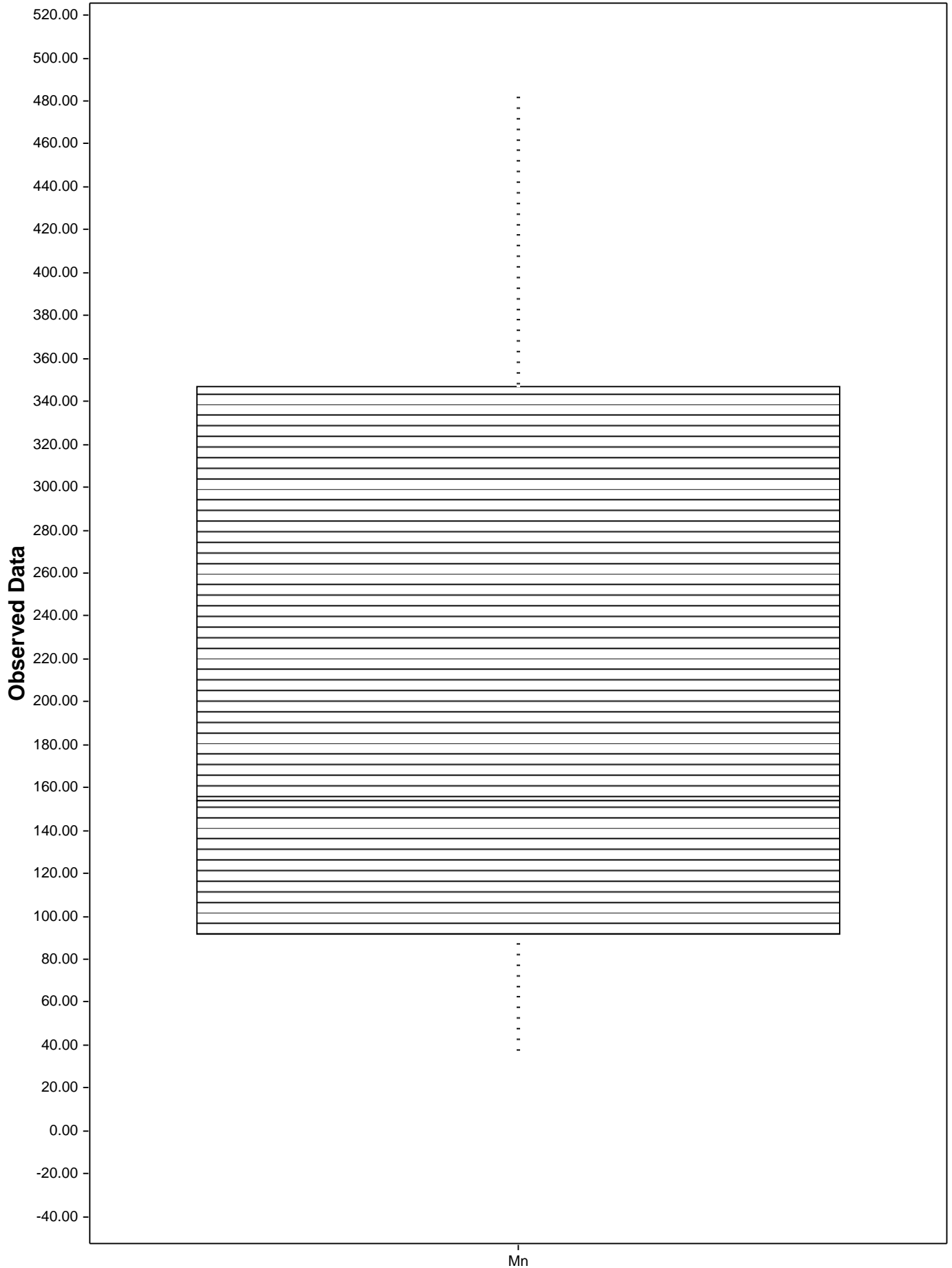
Box Plot for Chromium



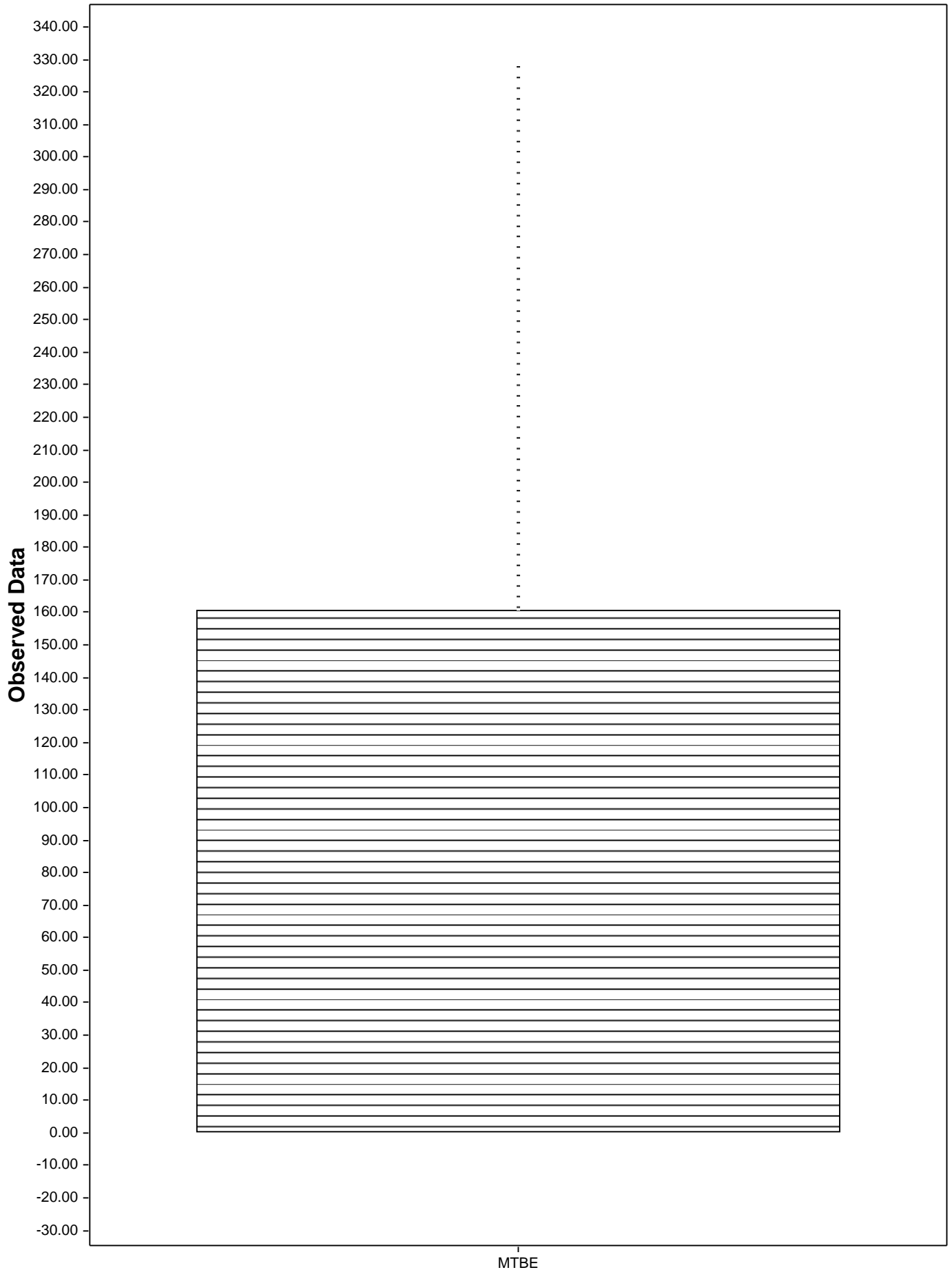
Box Plot for cis12DCE



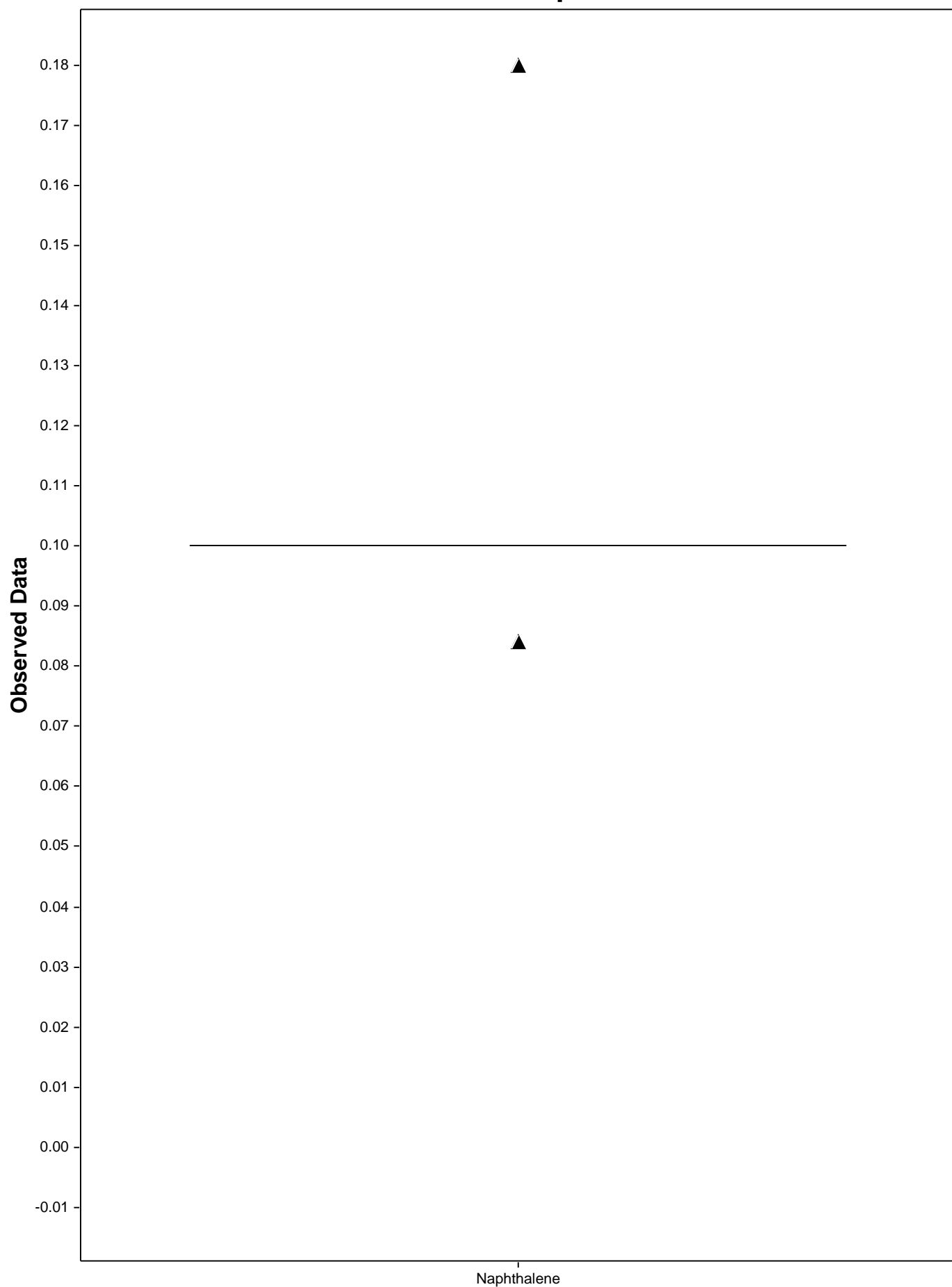
Box Plot for Mn



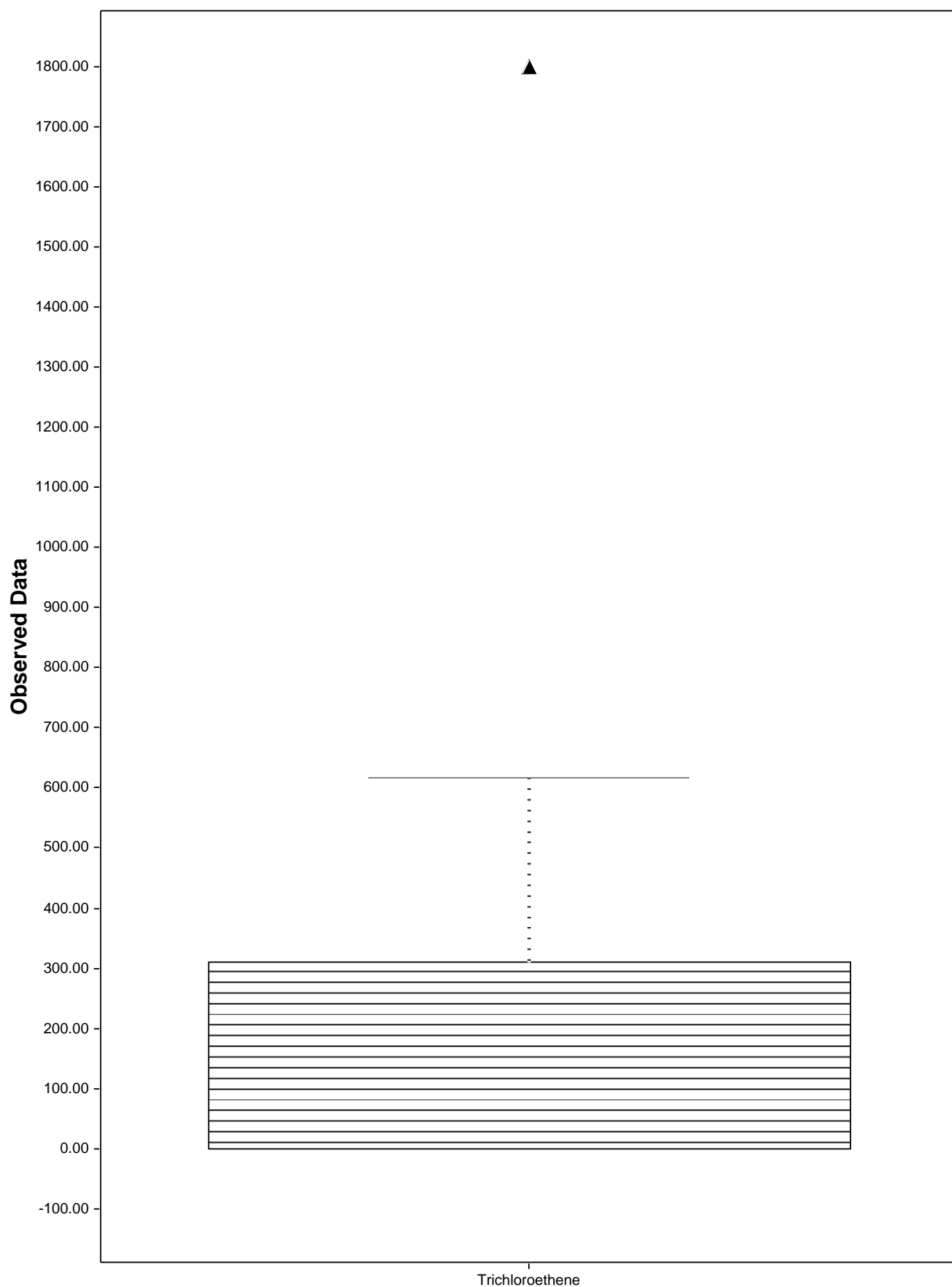
Box Plot for MTBE



Box Plot for Naphthalene



Box Plot for Trichloroethene



SHALLOW ONSITE GROUNDWATER

Benzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 12
Number of Distinct Detected Data	10	Number of Non-Detect Data 22
		Percent Non-Detects 64.71%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.155	Minimum Detected -1.864
Maximum Detected	24	Maximum Detected 3.178
Mean of Detected	2.708	Mean of Detected -0.196
SD of Detected	6.733	SD of Detected 1.27
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	34
Observations < Largest ND are treated as NDs	Number treated as Detected	0
	Single DL Non-Detect Percentage	100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.396	Shapiro Wilk Test Statistic 0.838
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	25.28	Mean 0.506
SD	64.28	SD 2.287
95% DL/2 (t) UCL	43.94	95% H-Stat (DL/2) UCL 126.4
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.984
		SD in Log Scale 1.097
		Mean in Original Scale 1.148
		SD in Original Scale 4.062
		95% t UCL 2.327
		95% Percentile Bootstrap UCL 2.494
		95% BCA Bootstrap UCL 3.299
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.452	Data Distribution Test with Detected Values Only
Theta Star	5.995	Data do not follow a Discernable Distribution (0.05)
nu star	10.84	
A-D Test Statistic		
5% A-D Critical Value	1.916	Nonparametric Statistics
K-S Test Statistic	0.783	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.783	Mean 1.357
Data not Gamma Distributed at 5% Significance Level	0.258	SD 4.384
		SE of Mean 0.867
		95% KM (t) UCL 2.824
		95% KM (z) UCL 2.782
		95% KM (jackknife) UCL 2.793
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 15.78
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 3.018
Minimum	1.00E-12	95% KM (Percentile Bootstrap) UCL 2.922
Maximum	24	95% KM (Chebyshev) UCL 5.135
Mean	6.099	97.5% KM (Chebyshev) UCL 6.77
Median	2.988	99% KM (Chebyshev) UCL 9.982
SD	7.215	
k star	0.221	Potential UCLs to Use
Theta star	27.59	95% KM (BCA) UCL 3.018
Nu star	15.03	
AppChi2	7.282	
95% Gamma Approximate UCL	12.59	
95% Adjusted Gamma UCL	13.07	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Chlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	16
Number of Distinct Detected Data	16 Number of Non-Detect Data	18
	Percent Non-Detects	52.94%
Raw Statistics		
Minimum Detected	0.21	Minimum Detected -1.561
Maximum Detected	65	Maximum Detected 4.174
Mean of Detected	18.98	Mean of Detected 1.561
SD of Detected	22.74	SD of Detected 2.156
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	34
Observations < Largest ND are treated as NDs	Number treated as Detected	0
	Single DL Non-Detect Percentage	100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.794 Shapiro Wilk Test Statistic	0.865
5% Shapiro Wilk Critical Value	0.887 5% Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	32.72 Mean	1.193
95% DL/2 (t) UCL	63.84 SD	2.534
	51.25 95% H-Stat (DL/2) UCL	654
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE method failed to converge properly	Log ROS Method	
	Mean in Log Scale	0.513
	SD in Log Scale	1.96
	Mean in Original Scale	9.53
	SD in Original Scale	17.82
	95% t UCL	14.7
	95% Percentile Bootstrap UCL	14.63
	95% BCA Bootstrap UCL	16.04
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.419 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	45.28	
nu star	13.41	
A-D Test Statistic		
5% A-D Critical Value	0.705 Nonparametric Statistics	
K-S Test Statistic	0.804 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.804 Mean	10.66
Data appear Gamma Distributed at 5% Significance Level	0.228 SD	18.58
	SE of Mean	3.538
	95% KM (t) UCL	16.65
	95% KM (z) UCL	16.48
	95% KM (jackknife) UCL	16.58
Assuming Gamma Distribution	0.21 95% KM (bootstrap t) UCL	19.42
Gamma ROS Statistics using Extrapolated Data	72.25 95% KM (BCA) UCL	16.52
Minimum	21.66 95% KM (Percentile Bootstrap) UCL	16.41
Maximum	15.06 95% KM (Chebyshev) UCL	26.09
Mean	21.7 97.5% KM (Chebyshev) UCL	32.76
Median	0.639 99% KM (Chebyshev) UCL	45.86
SD	33.92	
k star	43.42 Potential UCLs to Use	
Theta star	29.31 95% KM (t) UCL	16.65
Nu star	32.09	
AppChi2	32.73	
95% Gamma Approximate UCL		
95% Adjusted Gamma UCL		
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Chloroform

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 10
Number of Distinct Detected Data	10	Number of Non-Detect Data 24
		Percent Non-Detects 70.59%
Raw Statistics		Log-transformed Statistics
Minimum Detected	0.37	Minimum Detected -0.994
Maximum Detected	19	Maximum Detected 2.944
Mean of Detected	3.474	Mean of Detected 0.52
SD of Detected	5.637	SD of Detected 1.164
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.574	Shapiro Wilk Test Statistic 0.946
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value 0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	25.33	Mean 0.599
SD	64.21	SD 2.279
95% DL/2 (t) UCL	43.97	95% H-Stat (DL/2) UCL 135.1
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.536
		SD in Log Scale 1.126
		Mean in Original Scale 1.359
		SD in Original Scale 3.263
		95% t UCL 2.306
		95% Percentile Bootstrap UCL 2.422
		95% BCA Bootstrap UCL 3.278
		95% H-UCL 1.839
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.638	Data appear Gamma Distributed at 5% Significance Level
Theta Star	5.445	
nu star	12.76	
A-D Test Statistic		0.707 Nonparametric Statistics
5% A-D Critical Value		0.755 Kaplan-Meier (KM) Method
K-S Test Statistic		0.755 Mean 1.609
5% K-S Critical Value		0.275 SD 3.578
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.73
		95% KM (t) UCL 2.845
		95% KM (z) UCL 2.81
		95% KM (jackknife) UCL 2.811
		95% KM (bootstrap t) UCL 6.455
		95% KM (BCA) UCL 3.121
		95% KM (Percentile Bootstrap) UCL 2.948
		95% KM (Chebyshev) UCL 4.793
		97.5% KM (Chebyshev) UCL 6.17
		99% KM (Chebyshev) UCL 8.876
		10.67
		8.085 Potential UCLs to Use
		95% KM (t) UCL 2.845
		2.784
		95% Gamma Approximate UCL 3.684
		95% Adjusted Gamma UCL 3.897
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,2-Dibromo-3-chloropropane

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	7
Number of Distinct Detected Data	7 Number of Non-Detect Data	27
	Percent Non-Detects	79.41%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.039 Minimum Detected	-3.244
Maximum Detected	0.39 Maximum Detected	-0.942
Mean of Detected	0.129 Mean of Detected	-2.342
SD of Detected	0.124 SD of Detected	0.764
Minimum Non-Detect	0.05 Minimum Non-Detect	-2.996
Maximum Non-Detect	0.05 Maximum Non-Detect	-2.996

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.707	Shapiro Wilk Test Statistic 0.877
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value 0.803
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.0463	Mean -3.412
SD	0.0677	SD 0.642
95% DL/2 (t) UCL	0.066	95% H-Stat (DL/2) UCL 0.051
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -3.413
		SD in Log Scale 0.871
		Mean in Original Scale 0.0504
		SD in Original Scale 0.0682
		95% t UCL 0.0702
		95% Percentile Bootstrap UCL 0.0711
		95% BCA Bootstrap UCL 0.0843
		95% H-UCL 0.0682
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	1.164	Data Follow Appr. Gamma Distribution at 5% Significance Level
Theta Star	0.11	
nu star	16.29	
A-D Test Statistic	0.717	Nonparametric Statistics
5% A-D Critical Value	0.717	Kaplan-Meier (KM) Method
K-S Test Statistic	0.717	Mean 0.0574
5% K-S Critical Value	0.316	SD 0.0633
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean 0.0117
		95% KM (t) UCL 0.0773
Assuming Gamma Distribution		95% KM (z) UCL 0.0767
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.078
Minimum	1.00E-06	95% KM (bootstrap t) UCL 0.127
Maximum	0.39	95% KM (BCA) UCL 0.0994
Mean	0.0502	95% KM (Percentile Bootstrap) UCL 0.0949
Median	0.0305	95% KM (Chebyshev) UCL 0.109
SD	0.0752	97.5% KM (Chebyshev) UCL 0.131
k star	0.178	99% KM (Chebyshev) UCL 0.174
Theta star	0.282	
Nu star	12.1	Potential UCLs to Use
AppChi2	5.295	95% KM (t) UCL 0.0773
95% Gamma Approximate UCL	0.115	
95% Adjusted Gamma UCL	0.12	
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Dibromochloromethane

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	2
Number of Distinct Detected Data	2 Number of Non-Detect Data	32
	Percent Non-Detects	94.12%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.43 Minimum Detected	-0.844
Maximum Detected	1.2 Maximum Detected	0.182
Mean of Detected	0.815 Mean of Detected	-0.331
SD of Detected	0.544 SD of Detected	0.726
Minimum Non-Detect	0.5 Minimum Non-Detect	-0.693
Maximum Non-Detect	500 Maximum Non-Detect	6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
	Number treated as Non-Detect	34
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
		DL/2 Substitution Method
Mean	24.63	Mean 0.243
SD	64.41	SD 2.352
95% DL/2 (t) UCL	43.32	95% H-Stat (DL/2) UCL 124.1
Maximum Likelihood Estimate(MLE) Method N/A		
MLE method failed to converge properly		Log ROS Method
		Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)
nu star	N/A	
A-D Test Statistic N/A		
5% A-D Critical Value	N/A	Nonparametric Statistics
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method
5% K-S Critical Value	N/A	Mean 0.465
Data not Gamma Distributed at 5% Significance Level		SD 0.16
		SE of Mean 0.0484
		95% KM (t) UCL 0.547
		95% KM (z) UCL 0.545
		95% KM (jackknife) UCL 0.962
Assuming Gamma Distribution		
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL N/A
Minimum	N/A	95% KM (BCA) UCL N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL 1.2
Mean	N/A	95% KM (Chebyshev) UCL 0.676
Median	N/A	97.5% KM (Chebyshev) UCL 0.767
SD	N/A	99% KM (Chebyshev) UCL 0.946
k star	N/A	
Theta star	N/A	
Nu star	N/A	Potential UCLs to Use
AppChi2	N/A	95% KM (t) UCL 0.547
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL 1.2
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,2-Dichlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 13
Number of Distinct Detected Data	12	Number of Non-Detect Data 21
		Percent Non-Detects 61.76%
Raw Statistics		
Minimum Detected	0.2	Log-transformed Statistics Minimum Detected -1.609
Maximum Detected	56	Maximum Detected 4.025
Mean of Detected	7.864	Mean of Detected 0.893
SD of Detected	15.28	SD of Detected 1.55
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.541	Shapiro Wilk Test Statistic 0.982
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value 0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	27.14	DL/2 Substitution Method Mean 0.861
SD	64.2	SD 2.293
95% DL/2 (t) UCL	45.77	95% H-Stat (DL/2) UCL 184.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.614
		SD in Log Scale 1.774
		Mean in Original Scale 3.224
		SD in Original Scale 9.934
		95% t UCL 6.107
		95% Percentile Bootstrap UCL 6.324
		95% BCA Bootstrap UCL 8.008
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.464	Data Distribution Test with Detected Values Only
Theta Star	16.93	Data appear Gamma Distributed at 5% Significance Level
nu star	12.08	
A-D Test Statistic		
5% A-D Critical Value	0.707	Nonparametric Statistics
K-S Test Statistic	0.787	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.249	Mean 3.791
Data appear Gamma Distributed at 5% Significance Level		SD 10.4
		SE of Mean 1.995
		95% KM (t) UCL 7.166
		95% KM (z) UCL 7.072
Assuming Gamma Distribution		95% KM (jackknife) UCL 6.978
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL 15.89
Minimum	1.00E-12	95% KM (BCA) UCL 7.864
Maximum	60.6	95% KM (Percentile Bootstrap) UCL 7.422
Mean	13.79	95% KM (Chebyshev) UCL 12.49
Median	7.5	97.5% KM (Chebyshev) UCL 16.25
SD	17.24	99% KM (Chebyshev) UCL 23.64
k star	0.179	
Theta star	77.12	
Nu star	12.16	Potential UCLs to Use
AppChi2	5.334	95% KM (t) UCL 7.166
95% Gamma Approximate UCL	31.45	
95% Adjusted Gamma UCL	32.82	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,3-Dichlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 14
Number of Distinct Detected Data	13	Number of Non-Detect Data 20
		Percent Non-Detects 58.82%
Raw Statistics		
Minimum Detected	0.24	Log-transformed Statistics Minimum Detected -1.427
Maximum Detected	120	Maximum Detected 4.787
Mean of Detected	13.65	Mean of Detected 1.241
SD of Detected	31.16	SD of Detected 1.687
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.448	Shapiro Wilk Test Statistic 0.974
5% Shapiro Wilk Critical Value	0.874	5% Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	29.42	DL/2 Substitution Method
SD	65.87	Mean 0.888
95% DL/2 (t) UCL	48.54	SD 2.381
		95% H-Stat (DL/2) UCL 264.3
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.157
		SD in Log Scale 1.833
		Mean in Original Scale 5.947
		SD in Original Scale 20.63
		95% t UCL 11.93
		95% Percentile Bootstrap UCL 12.64
		95% BCA Bootstrap UCL 16.51
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.415	Data Distribution Test with Detected Values Only
Theta Star	32.89	Data appear Gamma Distributed at 5% Significance Level
nu star	11.62	
A-D Test Statistic		
5% A-D Critical Value	0.798	Nonparametric Statistics
K-S Test Statistic	0.8	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.243	Mean 6.81
Data appear Gamma Distributed at 5% Significance Level		SD 21.56
		SE of Mean 4.096
		95% KM (t) UCL 13.74
		95% KM (z) UCL 13.55
		95% KM (jackknife) UCL 13.62
		95% KM (bootstrap t) UCL 35.01
		95% KM (BCA) UCL 14.13
		95% KM (Percentile Bootstrap) UCL 14.37
		95% KM (Chebyshev) UCL 24.66
		97.5% KM (Chebyshev) UCL 32.39
		99% KM (Chebyshev) UCL 47.56
		Potential UCLs to Use
		95% KM (t) UCL 13.74
		95% Gamma Approximate UCL 62.99
		95% Adjusted Gamma UCL 66.04
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,4-Dichlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 14
Number of Distinct Detected Data	14	Number of Non-Detect Data 20
		Percent Non-Detects 58.82%
Raw Statistics		
Minimum Detected	0.43	Log-transformed Statistics Minimum Detected -0.844
Maximum Detected	110	Maximum Detected 4.7
Mean of Detected	23.22	Mean of Detected 1.996
SD of Detected	29.86	SD of Detected 1.893
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.754	Shapiro Wilk Test Statistic 0.9
5% Shapiro Wilk Critical Value	0.874	5% Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	33.36	DL/2 Substitution Method Mean 1.199
SD	64.82	SD 2.516
95% DL/2 (t) UCL	52.18	95% H-Stat (DL/2) UCL 612.2
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale 0.196
		SD in Log Scale 2.202
		Mean in Original Scale 9.985
		SD in Original Scale 21.87
		95% t UCL 16.33
		95% Percentile Bootstrap UCL 16.89
		95% BCA Bootstrap UCL 18.84
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.476	Data Distribution Test with Detected Values Only
Theta Star	48.75	Data appear Gamma Distributed at 5% Significance Level
nu star	13.34	
A-D Test Statistic		
5% A-D Critical Value	0.499	Nonparametric Statistics
K-S Test Statistic	0.789	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.789	Mean 11.55
Data appear Gamma Distributed at 5% Significance Level	0.241	SD 22.77
		SE of Mean 4.361
		95% KM (t) UCL 18.93
		95% KM (z) UCL 18.72
		95% KM (jackknife) UCL 18.74
		95% KM (bootstrap t) UCL 24.15
		95% KM (BCA) UCL 18.82
		95% KM (Percentile Bootstrap) UCL 19.27
		95% KM (Chebyshev) UCL 30.56
		97.5% KM (Chebyshev) UCL 38.78
		99% KM (Chebyshev) UCL 54.94
		Potential UCLs to Use
		95% KM (t) UCL 18.93
		95% Gamma Approximate UCL 65.84
		95% Adjusted Gamma UCL 68.4
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,1-Dichloroethane

General Statistics (µg/L)			
Number of Valid Data	34	Number of Detected Data	5
Number of Distinct Detected Data	5	Number of Non-Detect Data	29
		Percent Non-Detects	85.29%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.55	Minimum Detected	-0.598
Maximum Detected	11	Maximum Detected	2.398
Mean of Detected	3.13	Mean of Detected	0.545
SD of Detected	4.415	SD of Detected	1.111
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	34
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%
Warning: There are only 5 Detected Values in this data			
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions			
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.			
UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.632	Shapiro Wilk Test Statistic	0.847
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	25.02	Mean	0.465
SD	64.28	SD	2.317
95% DL/2 (t) UCL	43.68	95% H-Stat (DL/2) UCL	135.7
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-2.582
		SD in Log Scale	1.894
		Mean in Original Scale	0.537
		SD in Original Scale	1.888
		95% t UCL	1.085
		95% Percentile Bootstrap UCL	1.148
		95% BCA Bootstrap UCL	1.517
		95% H-UCL	1.544
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.522	Data appear Lognormal at 5% Significance Level	
Theta Star	5.997		
nu star	5.219		
A-D Test Statistic	0.748	Nonparametric Statistics	
5% A-D Critical Value	0.692	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.692	Mean	
5% K-S Critical Value	0.365	SD	
Data not Gamma Distributed at 5% Significance Level		SE of Mean	
		95% KM (t) UCL	
		95% KM (z) UCL	
		95% KM (jackknife) UCL	
		95% KM (bootstrap t) UCL	
		95% KM (BCA) UCL	
		95% KM (Percentile Bootstrap) UCL	
		95% KM (Chebyshev) UCL	
		97.5% KM (Chebyshev) UCL	
		99% KM (Chebyshev) UCL	
		5.141	
		6.089 Potential UCLs to Use	
		1.685 95% KM (BCA) UCL	
		1.663	
		1.781	
Note: DL/2 is not a recommended method.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,2-Dichloroethane

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	5
Number of Distinct Detected Data	5 Number of Non-Detect Data	29
	Percent Non-Detects	85.29%
Raw Statistics		
Minimum Detected	0.22	Minimum Detected -1.514
Maximum Detected	15	Maximum Detected 2.708
Mean of Detected	3.282	Mean of Detected -0.367
SD of Detected	6.553	SD of Detected 1.768
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	34
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: There are only 5 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.573 Shapiro Wilk Test Statistic	0.739
5% Shapiro Wilk Critical Value	0.762 5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	24.86 Mean	0.235
SD	64.36 SD	2.385
95% DL/2 (t) UCL	43.54 95% H-Stat (DL/2) UCL	139.8
Assuming Lognormal Distribution		
Maximum Likelihood Estimate(MLE) Method	N/A Log ROS Method	
MLE method failed to converge properly	Mean in Log Scale	-1.181
	SD in Log Scale	1.029
	Mean in Original Scale	0.786
	SD in Original Scale	2.525
	95% t UCL	1.519
	95% Percentile Bootstrap UCL	1.637
	95% BCA Bootstrap UCL	2.127
	95% H-UCL	0.814
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.301 Data do not follow a Discernable Distribution (0.05)	
Theta Star	10.89	
nu star	3.013	
A-D Test Statistic		
5% A-D Critical Value	0.957 Nonparametric Statistics	
K-S Test Statistic	0.722 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.722 Mean	0.822
Data not Gamma Distributed at 5% Significance Level	0.375 SD	2.782
	SE of Mean	0.599
	95% KM (t) UCL	1.836
	95% KM (z) UCL	1.808
	95% KM (jackknife) UCL	1.751
	95% KM (bootstrap t) UCL	17.53
	95% KM (BCA) UCL	2.226
	95% KM (Percentile Bootstrap) UCL	1.924
	95% KM (Chebyshev) UCL	3.433
	97.5% KM (Chebyshev) UCL	4.563
	99% KM (Chebyshev) UCL	6.783
	9.797	
	8.06 Potential UCLs to Use	
	2.77 97.5% KM (Chebyshev) UCL	4.563
	3.379	
	3.575	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,1-Dichloroethene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 13
Number of Distinct Detected Data	12	Number of Non-Detect Data 21
		Percent Non-Detects 61.76%
Raw Statistics		
Minimum Detected	0.725	Log-transformed Statistics
Maximum Detected	280	Minimum Detected -0.322
Mean of Detected	28.27	Maximum Detected 5.635
SD of Detected	75.98	Mean of Detected 1.726
Minimum Non-Detect	0.5	SD of Detected 1.657
Maximum Non-Detect	500	Minimum Non-Detect -0.693
		Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.39	Shapiro Wilk Test Statistic 0.927
5% Shapiro Wilk Critical Value	0.866	5% Shapiro Wilk Critical Value 0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	35.12	DL/2 Substitution Method
SD	76.91	Mean 1.275
95% DL/2 (t) UCL	57.45	SD 2.319
		95% H-Stat (DL/2) UCL 307.8
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.223
		SD in Log Scale 2.135
		Mean in Original Scale 11.11
		SD in Original Scale 47.83
		95% t UCL 24.99
		95% Percentile Bootstrap UCL 27.1
		95% BCA Bootstrap UCL 42.58
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.364	Data Distribution Test with Detected Values Only
Theta Star	77.7	Data appear Lognormal at 5% Significance Level
nu star	9.458	
A-D Test Statistic		
5% A-D Critical Value	1.323	Nonparametric Statistics
K-S Test Statistic	0.809	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.809	Mean 12.49
Data not Gamma Distributed at 5% Significance Level	0.253	SD 48.39
		SE of Mean 8.916
		95% KM (t) UCL 27.57
		95% KM (z) UCL 27.15
		95% KM (jackknife) UCL 27.21
		95% KM (bootstrap t) UCL 121.5
		95% KM (BCA) UCL 30.54
		95% KM (Percentile Bootstrap) UCL 29.65
		95% KM (Chebyshev) UCL 51.35
		97.5% KM (Chebyshev) UCL 68.16
		99% KM (Chebyshev) UCL 101.2
		Potential UCLs to Use
		97.5% KM (Chebyshev) UCL 68.16
		95% Gamma Approximate UCL 106.9
		95% Adjusted Gamma UCL 112.6
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

cis-1,2-Dichloroethene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	32
Number of Distinct Detected Data	28 Number of Non-Detect Data	2
	Percent Non-Detects	5.88%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	0.96 Minimum Detected	-0.0408
Maximum Detected	390000 Maximum Detected	12.87
Mean of Detected	21780 Mean of Detected	6.548
SD of Detected	71726 SD of Detected	3.386
Minimum Non-Detect	0.5 Minimum Non-Detect	-0.693
Maximum Non-Detect	0.5 Maximum Non-Detect	-0.693
UCL Statistics		
Normal Distribution Test with Detected Values Only		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.342 Shapiro Wilk Test Statistic	0.945
5% Shapiro Wilk Critical Value	0.93 5% Shapiro Wilk Critical Value	0.93
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
Assuming Lognormal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	20499 Mean	6.081
SD	69713 SD	3.79
95% DL/2 (t) UCL	40732 95% H-Stat (DL/2) UCL	50855438
Maximum Likelihood Estimate(MLE) Method		
Log ROS Method		
Mean	17502 Mean in Log Scale	6.079
SD	71253 SD in Log Scale	3.797
95% MLE (t) UCL	38182 Mean in Original Scale	20499
95% MLE (Tiku) UCL	36122 SD in Original Scale	69713
	95% t UCL	40732
	95% Percentile Bootstrap UCL	44072
	95% BCA Bootstrap UCL	59613
Gamma Distribution Test with Detected Values Only		
Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.213 Data appear Lognormal at 5% Significance Level	
Theta Star	102300	
nu star	13.63	
A-D Test Statistic		
1.394 Nonparametric Statistics		
5% A-D Critical Value	0.893 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.893 Mean	20499
5% K-S Critical Value	0.172 SD	68680
Data not Gamma Distributed at 5% Significance Level	SE of Mean	11967
	95% KM (t) UCL	40751
	95% KM (z) UCL	40183
	95% KM (jackknife) UCL	40732
Assuming Gamma Distribution	1.00E-12 95% KM (bootstrap t) UCL	113532
Gamma ROS Statistics using Extrapolated Data	390000 95% KM (BCA) UCL	42416
Minimum	20499 95% KM (Percentile Bootstrap) UCL	41743
Maximum	1050 95% KM (Chebyshev) UCL	72662
Mean	69713 97.5% KM (Chebyshev) UCL	95233
Median	0.15 99% KM (Chebyshev) UCL	139569
SD	136262	
k star	10.23 Potential UCLs to Use	
Theta star	4.086 99% KM (Chebyshev) UCL	139569
Nu star	51323	
AppChi2	53839	
95% Gamma Approximate UCL		
95% Adjusted Gamma UCL		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

trans-1,2-Dichloroethene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 23
Number of Distinct Detected Data	22	Number of Non-Detect Data 11
		Percent Non-Detects 32.35%
Raw Statistics		Log-transformed Statistics
Minimum Detected	0.11	Minimum Detected -2.207
Maximum Detected	1300	Maximum Detected 7.17
Mean of Detected	137.4	Mean of Detected 2.684
SD of Detected	338.3	SD of Detected 2.269
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	250	Maximum Non-Detect 5.521
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 31
Observations < Largest ND are treated as NDs		Number treated as Detected 3
		Single DL Non-Detect Percentage 91.18%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.45	Shapiro Wilk Test Statistic 0.96
5% Shapiro Wilk Critical Value	0.914	5% Shapiro Wilk Critical Value 0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	100.8	Mean 1.929
SD	282.8	SD 2.584
95% DL/2 (t) UCL	182.9	95% H-Stat (DL/2) UCL 1679
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale 1.593
		SD in Log Scale 2.589
		Mean in Original Scale 93.44
		SD in Original Scale 283.7
		95% t UCL 175.8
		95% Percentile Bootstrap UCL 178.1
		95% BCA Bootstrap UCL 225
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.296	Data appear Lognormal at 5% Significance Level
Theta Star	464.7	
nu star	13.6	
A-D Test Statistic		1.871 Nonparametric Statistics
5% A-D Critical Value	0.847	Kaplan-Meier (KM) Method
K-S Test Statistic	0.847	Mean 93.95
5% K-S Critical Value	0.197	SD 279.4
Data not Gamma Distributed at 5% Significance Level		SE of Mean 48.99
		95% KM (t) UCL 176.9
		95% KM (z) UCL 174.5
Assuming Gamma Distribution		95% KM (jackknife) UCL 176.3
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL 329.6
Minimum	1.00E-12	95% KM (BCA) UCL 176.1
Maximum	1300	95% KM (Percentile Bootstrap) UCL 181.8
Mean	105.7	95% KM (Chebyshev) UCL 307.5
Median	7.3	97.5% KM (Chebyshev) UCL 399.9
SD	288.8	99% KM (Chebyshev) UCL 581.4
k star	0.0959	
Theta star	1102	
Nu star	6.521	Potential UCLs to Use
AppChi2	1.912	99% KM (Chebyshev) UCL 581.4
95% Gamma Approximate UCL	360.4	
95% Adjusted Gamma UCL	384.7	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Ethylbenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 2
Number of Distinct Detected Data	2	Number of Non-Detect Data 32
		Percent Non-Detects 94.12%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.62	Minimum Detected -0.478
Maximum Detected	20	Maximum Detected 2.996
Mean of Detected	10.31	Mean of Detected 1.259
SD of Detected	13.7	SD of Detected 2.456
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	34
Observations < Largest ND are treated as NDs	Number treated as Detected	0
	Single DL Non-Detect Percentage	100.00%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods. Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
		DL/2 Substitution Method
Mean	25	Mean 0.241
SD	64.35	SD 2.396
95% DL/2 (t) UCL	43.68	95% H-Stat (DL/2) UCL 146.5
Maximum Likelihood Estimate(MLE) Method		
MLE method failed to converge properly	N/A	Log ROS Method
		Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)
nu star	N/A	
A-D Test Statistic		
5% A-D Critical Value	N/A	Nonparametric Statistics
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method
5% K-S Critical Value	N/A	Mean 1.312
Data not Gamma Distributed at 5% Significance Level		SD 3.596
		SE of Mean 0.961
		95% KM (t) UCL 2.939
		95% KM (z) UCL 2.893
		95% KM (jackknife) UCL 13.92
		95% KM (bootstrap t) UCL 1.463
		95% KM (BCA) UCL 20
		95% KM (Percentile Bootstrap) UCL 20
		95% KM (Chebyshev) UCL 5.502
		97.5% KM (Chebyshev) UCL 7.315
		99% KM (Chebyshev) UCL 10.88
Assuming Gamma Distribution		
Gamma ROS Statistics using Extrapolated Data		Potential UCLs to Use
Minimum	N/A	99% KM (Chebyshev) UCL 10.88
Maximum	N/A	
Mean	N/A	
Median	N/A	
SD	N/A	
k star	N/A	
Theta star	N/A	
Nu star	N/A	
AppChi2	N/A	
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Methylcyclohexane

General Statistics (µg/L)		
Number of Valid Data	33	Number of Detected Data 6
Number of Distinct Detected Data	6	Number of Non-Detect Data 27
		Percent Non-Detects 81.82%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.89	Minimum Detected -0.117
Maximum Detected	42	Maximum Detected 3.738
Mean of Detected	11.02	Mean of Detected 1.583
SD of Detected	15.66	SD of Detected 1.442
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	33
Observations < Largest ND are treated as NDs	Number treated as Detected	0
	Single DL Non-Detect Percentage	100.00%

Warning: There are only 6 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.71	Shapiro Wilk Test Statistic 0.96
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value 0.788
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	26.72	Mean 0.473
SD	65.14	SD 2.421
95% DL/2 (t) UCL	45.93	95% H-Stat (DL/2) UCL 207.1
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -2.183
		SD in Log Scale 2.449
		Mean in Original Scale 2.107
		SD in Original Scale 7.518
		95% t UCL 4.323
		95% Percentile Bootstrap UCL 4.626
		95% BCA Bootstrap UCL 6.338
		95% H-UCL 16.23
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.479	Data appear Gamma Distributed at 5% Significance Level
Theta Star	23.01	
nu star	5.745	
A-D Test Statistic		0.31 Nonparametric Statistics
5% A-D Critical Value	0.722	Kaplan-Meier (KM) Method
K-S Test Statistic	0.722	Mean 3.132
5% K-S Critical Value	0.344	SD 7.826
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 1.627
		95% KM (t) UCL 5.888
		95% KM (z) UCL 5.808
		95% KM (jackknife) UCL 5.518
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 11.3
Gamma ROS Statistics using Extrapolated Data	1.00E-06	95% KM (BCA) UCL 11
Minimum	42	95% KM (Percentile Bootstrap) UCL 7.8
Maximum	2.003	95% KM (Chebyshev) UCL 10.22
Mean	1.00E-06	97.5% KM (Chebyshev) UCL 13.29
Median	7.545	99% KM (Chebyshev) UCL 19.32
SD	0.0857	
k star	23.36	
Theta star	5.657	Potential UCLs to Use
Nu star	1.467	95% KM (t) UCL 5.888
AppChi2	7.722	
95% Gamma Approximate UCL	8.323	
95% Adjusted Gamma UCL		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

Methylene chloride

Warning: There are only 4 Distinct Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Tetrachloroethene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 21
Number of Distinct Detected Data	18	Number of Non-Detect Data 13
		Percent Non-Detects 38.24%
Raw Statistics		
Minimum Detected	0.25	Minimum Detected -1.386
Maximum Detected	1600	Maximum Detected 7.378
Mean of Detected	98	Mean of Detected 1.758
SD of Detected	346.2	SD of Detected 2.314
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 33
Observations < Largest ND are treated as NDs		Number treated as Detected 1
		Single DL Non-Detect Percentage 97.06%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.297	Shapiro Wilk Test Statistic 0.932
5% Shapiro Wilk Critical Value	0.908	5% Shapiro Wilk Critical Value 0.908
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	83.84	DL/2 Substitution Method
SD	276.2	Mean 1.707
95% DL/2 (t) UCL	164	SD 2.513
		95% H-Stat (DL/2) UCL 1007
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale 0.821
		SD in Log Scale 2.37
		Mean in Original Scale 61.04
		SD in Original Scale 273.7
		95% t UCL 140.5
		95% Percentile Bootstrap UCL 152.6
		95% BCA Bootstrap UCL 205
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.247	Data Distribution Test with Detected Values Only
Theta Star	396.8	Data appear Lognormal at 5% Significance Level
nu star	10.37	
A-D Test Statistic		
5% A-D Critical Value	2.15	Nonparametric Statistics
K-S Test Statistic	0.868	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.208	Mean 62.72
Data not Gamma Distributed at 5% Significance Level		SD 269.6
		SE of Mean 47.42
		95% KM (t) UCL 143
		95% KM (z) UCL 140.7
		95% KM (jackknife) UCL 142.2
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 647.4
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 162.7
Minimum	0.25	95% KM (Percentile Bootstrap) UCL 154.6
Maximum	1600	95% KM (Chebyshev) UCL 269.4
Mean	98.47	97.5% KM (Chebyshev) UCL 358.8
Median	71.59	99% KM (Chebyshev) UCL 534.5
SD	269.5	
k star	0.366	Potential UCLs to Use
Theta star	269	
Nu star	24.89	99% KM (Chebyshev) UCL 534.5
AppChi2	14.53	
95% Gamma Approximate UCL	168.7	
95% Adjusted Gamma UCL	173.4	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,2,3-Trichlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 16
Number of Distinct Detected Data	15	Number of Non-Detect Data 18
		Percent Non-Detects 52.94%
Raw Statistics		
Minimum Detected	0.58	Log-transformed Statistics
Maximum Detected	280	Minimum Detected -0.545
Mean of Detected	29.91	Maximum Detected 5.635
SD of Detected	70.46	Mean of Detected 1.654
Minimum Non-Detect	0.5	SD of Detected 1.881
Maximum Non-Detect	500	Minimum Non-Detect -0.693
		Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.471	Shapiro Wilk Test Statistic 0.925
5% Shapiro Wilk Critical Value	0.887	5% Shapiro Wilk Critical Value 0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	37.86	DL/2 Substitution Method
SD	77.35	Mean 1.236
95% DL/2 (t) UCL	60.31	SD 2.439
		95% H-Stat (DL/2) UCL 468.9
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.184
		SD in Log Scale 2.468
		Mean in Original Scale 14.32
		SD in Original Scale 49.8
		95% t UCL 28.77
		95% Percentile Bootstrap UCL 30.31
		95% BCA Bootstrap UCL 41.31
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.351	Data Distribution Test with Detected Values Only
Theta Star	85.28	Data appear Lognormal at 5% Significance Level
nu star	11.22	
A-D Test Statistic		
5% A-D Critical Value	1.16	Nonparametric Statistics
K-S Test Statistic	0.821	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.231	Mean 15.99
Data not Gamma Distributed at 5% Significance Level		SD 50.49
		SE of Mean 9.266
		95% KM (t) UCL 31.67
		95% KM (z) UCL 31.23
Assuming Gamma Distribution		95% KM (jackknife) UCL 31.41
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL 94.56
Minimum	1.00E-12	95% KM (BCA) UCL 32.79
Maximum	280	95% KM (Percentile Bootstrap) UCL 32.39
Mean	31.75	95% KM (Chebyshev) UCL 56.38
Median	5.55	97.5% KM (Chebyshev) UCL 73.86
SD	63.82	99% KM (Chebyshev) UCL 108.2
k star	0.119	
Theta star	265.8	
Nu star	8.124	Potential UCLs to Use
AppChi2	2.807	97.5% KM (Chebyshev) UCL 73.86
95% Gamma Approximate UCL	91.89	
95% Adjusted Gamma UCL	97.18	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,2,4-Trichlorobenzene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 21
Number of Distinct Detected Data	19	Number of Non-Detect Data 13
		Percent Non-Detects 38.24%
Raw Statistics		
Minimum Detected	0.4	Minimum Detected -0.916
Maximum Detected	1600	Maximum Detected 7.378
Mean of Detected	143.5	Mean of Detected 3.043
SD of Detected	349	SD of Detected 2.242
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	33
Observations < Largest ND are treated as NDs	Number treated as Detected	1
	Single DL Non-Detect Percentage	97.06%
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.435 Shapiro Wilk Test Statistic	0.974
5% Shapiro Wilk Critical Value	0.908 5% Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	100.4 Mean	1.911
95% DL/2 (t) UCL	281 SD	2.757
	181.9 95% H-Stat (DL/2) UCL	3463
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale 1.547
		SD in Log Scale 2.764
		Mean in Original Scale 89.02
		SD in Original Scale 280.7
		95% t UCL 170.5
		95% Percentile Bootstrap UCL 179.6
		95% BCA Bootstrap UCL 235.4
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.331 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	433	
nu star	13.92	
A-D Test Statistic		
5% A-D Critical Value	0.676 Nonparametric Statistics	
K-S Test Statistic	0.836 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.836 Mean	91.01
Data appear Gamma Distributed at 5% Significance Level	0.204 SD	276.5
	SE of Mean	48.69
	95% KM (t) UCL	173.4
	95% KM (z) UCL	171.1
	95% KM (jackknife) UCL	172.5
	95% KM (bootstrap t) UCL	372.3
	95% KM (BCA) UCL	178.7
	95% KM (Percentile Bootstrap) UCL	177.5
	9.75 95% KM (Chebyshev) UCL	303.3
	280.7 97.5% KM (Chebyshev) UCL	395.1
	0.0984 99% KM (Chebyshev) UCL	575.5
	1044	
	6.693 Potential UCLs to Use	
	2.003 95% KM (BCA) UCL	178.7
	95% Gamma Approximate UCL	343.3
	95% Adjusted Gamma UCL	365.9
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,1,2-Trichloroethane

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 10
Number of Distinct Detected Data	10	Number of Non-Detect Data 24
		Percent Non-Detects 70.59%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.49	Minimum Detected -0.713
Maximum Detected	120	Maximum Detected 4.787
Mean of Detected	18.34	Mean of Detected 1.64
SD of Detected	36.46	SD of Detected 1.651
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	500	Maximum Non-Detect 6.215
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 34
Observations < Largest ND are treated as NDs		Number treated as Detected 0
		Single DL Non-Detect Percentage 100.00%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.532	Shapiro Wilk Test Statistic 0.96
5% Shapiro Wilk Critical Value	0.842	5% Shapiro Wilk Critical Value 0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method
Mean	29.55	Mean 0.88
SD	65.85	SD 2.402
95% DL/2 (t) UCL	48.66	95% H-Stat (DL/2) UCL 283.8
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale -0.387
		SD in Log Scale 1.877
		Mean in Original Scale 5.738
		SD in Original Scale 20.76
		95% t UCL 11.76
		95% Percentile Bootstrap UCL 12.56
		95% BCA Bootstrap UCL 16.88
		95% H-UCL 13.13
Gamma Distribution Test with Detected Values Only		
		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.417	Data appear Gamma Distributed at 5% Significance Level
Theta Star	43.99	
nu star	8.338	
A-D Test Statistic		
	0.641	Nonparametric Statistics
5% A-D Critical Value	0.777	Kaplan-Meier (KM) Method
K-S Test Statistic	0.777	Mean 6.683
5% K-S Critical Value	0.281	SD 21.67
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 4.181
		95% KM (t) UCL 13.76
		95% KM (z) UCL 13.56
		95% KM (jackknife) UCL 13.17
		95% KM (bootstrap t) UCL 35.27
		95% KM (BCA) UCL 17.03
		95% KM (Percentile Bootstrap) UCL 14.45
		95% KM (Chebyshev) UCL 24.91
		97.5% KM (Chebyshev) UCL 32.8
		99% KM (Chebyshev) UCL 48.29
		60.35
		6.078
		Potential UCLs to Use
		95% KM (t) UCL 13.76
		1.68
		AppChi2
		95% Gamma Approximate UCL 19.52
		95% Adjusted Gamma UCL 20.9
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Trichloroethene

General Statistics (µg/L)		
Number of Valid Observations	34	Number of Distinct Observations30
Raw Statistics		
Minimum	0.53	Log-transformed StatisticsMinimum of Log Data-0.635
Maximum	170000	Maximum of Log Data12.04
Mean	11107	Mean of log Data6.298
Median	1400	SD of log Data3.417
SD	31037	
Coefficient of Variation	2.794	
Skewness	4.538	
Relevant UCL Statistics		
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.395	Shapiro Wilk Test Statistic0.941
Shapiro Wilk Critical Value	0.933	Shapiro Wilk Critical Value0.933
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
95% Student's-t UCL	20115	95% H-UCL7341386
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL364272
95% Adjusted-CLT UCL (Chen-1995)	24288	97.5% Chebyshev (MVUE) UCL487105
95% Modified-t UCL (Johnson-1978)	20806	99% Chebyshev (MVUE) UCL728386
Gamma Distribution Test		
Data Distribution		
k star (bias corrected)	0.236	Data appear Gamma Distributed at 5% Significance Level
Theta Star	47057	
MLE of Mean	11107	
MLE of Standard Deviation	22862	
nu star	16.05	
Approximate Chi Square Value (.05)	7.998	Nonparametric Statistics
Adjusted Level of Significance	0.0422	95% CLT UCL19862
Adjusted Chi Square Value	7.717	95% Jackknife UCL20115
		95% Standard Bootstrap UCL19756
Anderson-Darling Test Statistic	0.567	95% Bootstrap-t UCL48714
Anderson-Darling 5% Critical Value	0.883	95% Hall's Bootstrap UCL55332
Kolmogorov-Smirnov Test Statistic	0.119	95% Percentile Bootstrap UCL20775
Kolmogorov-Smirnov 5% Critical Value	0.166	95% BCA Bootstrap UCL27922
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL34309
		97.5% Chebyshev(Mean, Sd) UCL44348
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL64068
95% Approximate Gamma UCL	22291	
95% Adjusted Gamma UCL	23103	
Potential UCL to Use	Use 95% Adjusted Gamma UCL23103	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

o-Xylene

General Statistics - Data are in µg/L.

Number of Valid Data	34	Number of Detected Data	3
Number of Distinct Detected Data	3	Number of Non-Detect Data	31
		Percent Non-Detects	91.18%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.4	Minimum Detected	0.336
Maximum Detected	85	Maximum Detected	4.443
Mean of Detected	29.47	Mean of Detected	1.824
SD of Detected	48.09	SD of Detected	2.275
Minimum Non-Detect	0.5	Minimum Non-Detect	-0.693
Maximum Non-Detect	500	Maximum Non-Detect	6.215

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	34
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	0
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	100.00%

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics			
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.755	Shapiro Wilk Test Statistic	0.815
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value	0.767
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	26.99	Mean	0.369
SD	65.12	SD	2.437
95% DL/2 (t) UCL	45.89	95% H-Stat (DL/2) UCL	195.2

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-7.073
		SD in Log Scale	4.35
		Mean in Original Scale	2.609
		SD in Original Scale	14.56
		95% t UCL	6.836
		95% Percentile Bootstrap UCL	7.603
		95% BCA Bootstrap UCL	12.63
		95% H-UCL	3827

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data appear Lognormal at 5% Significance Level	
Theta Star	N/A		
nu star	N/A		

A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	4.213
5% K-S Critical Value	N/A	SD	15
Data not Gamma Distributed at 5% Significance Level		SE of Mean	3.355
		95% KM (t) UCL	9.89
		95% KM (z) UCL	9.731
Assuming Gamma Distribution		95% KM (jackknife) UCL	8.519
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	279.8
Minimum	N/A	95% KM (BCA) UCL	N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL	85
Mean	N/A	95% KM (Chebyshev) UCL	18.84
Median	N/A	97.5% KM (Chebyshev) UCL	25.16
SD	N/A	99% KM (Chebyshev) UCL	37.59
k star	N/A		
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	99% KM (Chebyshev) UCL	37.59
95% Gamma Approximate UCL	N/A		
95% Adjusted Gamma UCL	N/A		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Vinyl chloride

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 22
Number of Distinct Detected Data	22	Number of Non-Detect Data 12
		Percent Non-Detects 35.29%
Raw Statistics		
Minimum Detected	0.5	Minimum Detected -0.693
Maximum Detected	860	Maximum Detected 6.757
Mean of Detected	138.9	Mean of Detected 3.483
SD of Detected	241.4	SD of Detected 2.112
Minimum Non-Detect	0.5	Minimum Non-Detect -0.693
Maximum Non-Detect	250	Maximum Non-Detect 5.521
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 31
Observations < Largest ND are treated as NDs		Number treated as Detected 3
		Single DL Non-Detect Percentage 91.18%
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.586	Shapiro Wilk Test Statistic 0.916
5% Shapiro Wilk Critical Value	0.911	5% Shapiro Wilk Critical Value 0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
Mean	97.73	DL/2 Substitution Method
SD	202.7	Mean 2.327
95% DL/2 (t) UCL	156.5	SD 2.733
		95% H-Stat (DL/2) UCL 4710
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale 2.076
		SD in Log Scale 2.715
		Mean in Original Scale 90.6
		SD in Original Scale 203.7
		95% t UCL 149.7
		95% Percentile Bootstrap UCL 148.7
		95% BCA Bootstrap UCL 175.5
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.415	Data Distribution Test with Detected Values Only
Theta Star	334.4	Data Follow Appr. Gamma Distribution at 5% Significance Level
nu star	18.27	
A-D Test Statistic		
5% A-D Critical Value	0.745	Nonparametric Statistics
K-S Test Statistic	0.816	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.816	Mean 92.01
Data follow Appr. Gamma Distribution at 5% Significance Level	0.197	SD 200.5
		SE of Mean 35.26
		95% KM (t) UCL 151.7
		95% KM (z) UCL 150
Assuming Gamma Distribution		95% KM (jackknife) UCL 151.2
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL 211.9
Minimum	1.00E-12	95% KM (BCA) UCL 158
Maximum	860	95% KM (Percentile Bootstrap) UCL 155.6
Mean	104.1	20 95% KM (Chebyshev) UCL 245.7
Median		211.1 97.5% KM (Chebyshev) UCL 312.2
SD		0.107 99% KM (Chebyshev) UCL 442.8
k star		971.5
Theta star		7.285 Potential UCLs to Use
Nu star		95% KM (BCA) UCL 158
AppChi2	2.328	
95% Gamma Approximate UCL	325.6	
95% Adjusted Gamma UCL	345.9	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Benzo(a)anthracene

General Statistics (µg/L)

Number of Valid Data	34	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	32
		Percent Non-Detects	94.12%

Raw Statistics

Minimum Detected	0.18	Minimum Detected	-1.715
Maximum Detected	1.7	Maximum Detected	0.531
Mean of Detected	0.94	Mean of Detected	-0.592
SD of Detected	1.075	SD of Detected	1.588
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1	Maximum Non-Detect	-2.303

Log-transformed Statistics

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level	

Lognormal Distribution Test with Detected Values Only

Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A
Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution

DL/2 Substitution Method

Mean	0.102
SD	0.283
95% DL/2 (t) UCL	0.185

Assuming Lognormal Distribution

DL/2 Substitution Method

Mean	-2.854
SD	0.637
95% H-Stat (DL/2) UCL	0.0886

Maximum Likelihood Estimate(MLE) Method

MLE method failed to converge properly

N/A

Log ROS Method

Mean in Log Scale	N/A
SD in Log Scale	N/A
Mean in Original Scale	N/A
SD in Original Scale	N/A
95% t UCL	N/A
95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A
95% H-UCL	N/A

Gamma Distribution Test with Detected Values Only

k star (bias corrected)	N/A
Theta Star	N/A
nu star	N/A

Data Distribution Test with Detected Values Only

Data do not follow a Discernable Distribution (0.05)

A-D Test Statistic

5% A-D Critical Value	N/A
K-S Test Statistic	N/A
5% K-S Critical Value	N/A

Data not Gamma Distributed at 5% Significance Level

Nonparametric Statistics

Kaplan-Meier (KM) Method

Mean	0.225
SD	0.257
SE of Mean	0.0623
95% KM (t) UCL	0.33
95% KM (z) UCL	0.327
95% KM (jackknife) UCL	N/A
95% KM (bootstrap t) UCL	N/A
95% KM (BCA) UCL	N/A
95% KM (Percentile Bootstrap) UCL	N/A
95% KM (Chebyshev) UCL	0.496
97.5% KM (Chebyshev) UCL	0.614
99% KM (Chebyshev) UCL	0.844

Assuming Gamma Distribution

Gamma ROS Statistics using Extrapolated Data

Minimum	N/A
Maximum	N/A
Mean	N/A
Median	N/A
SD	N/A
k star	N/A
Theta star	N/A
Nu star	N/A
AppChi2	N/A
95% Gamma Approximate UCL	N/A
95% Adjusted Gamma UCL	N/A

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Benzo(a)pyrene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	3
Number of Distinct Detected Data	3 Number of Non-Detect Data	31
	Percent Non-Detects	91.18%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.14 Minimum Detected	-1.966
Maximum Detected	2.5 Maximum Detected	0.916
Mean of Detected	0.947 Mean of Detected	-0.886
SD of Detected	1.346 SD of Detected	1.571
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.769	Shapiro Wilk Test Statistic 0.841
5% Shapiro Wilk Critical Value	0.767	5% Shapiro Wilk Critical Value 0.767
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.129	Mean -2.81
SD	0.42	SD 0.72
95% DL/2 (t) UCL	0.251	95% H-Stat (DL/2) UCL 0.102
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -11.09
		SD in Log Scale 5.553
		Mean in Original Scale 0.0845
		SD in Original Scale 0.429
		95% t UCL 0.209
		95% Percentile Bootstrap UCL 0.23
		95% BCA Bootstrap UCL 0.309
		95% H-UCL 970204
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data appear Normal at 5% Significance Level
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	Nonparametric Statistics
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.211
5% K-S Critical Value	N/A	SD 0.399
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0837
		95% KM (t) UCL 0.353
		95% KM (z) UCL 0.349
		95% KM (jackknife) UCL 0.308
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 2.303
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 2.5
Minimum	N/A	95% KM (Percentile Bootstrap) UCL 2.5
Maximum	N/A	95% KM (Chebyshev) UCL 0.576
Mean	N/A	97.5% KM (Chebyshev) UCL 0.734
Median	N/A	99% KM (Chebyshev) UCL 1.044
SD	N/A	
k star	N/A	Potential UCLs to Use
Theta star	N/A	95% KM (t) UCL 0.353
Nu star	N/A	95% KM (Percentile Bootstrap) UCL 2.5
AppChi2	N/A	
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Benzo(b)fluoranthene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	2
Number of Distinct Detected Data	2 Number of Non-Detect Data	32
	Percent Non-Detects	94.12%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	0.38 Minimum Detected	-0.968
Maximum Detected	2.1 Maximum Detected	0.742
Mean of Detected	1.24 Mean of Detected	-0.113
SD of Detected	1.216 SD of Detected	1.209
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.12	Mean -2.826
SD	0.354	SD 0.72
95% DL/2 (t) UCL	0.223	95% H-Stat (DL/2) UCL 0.1
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	Nonparametric Statistics
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.431
5% K-S Critical Value	N/A	SD 0.291
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0705
		95% KM (t) UCL 0.55
		95% KM (z) UCL 0.547
Assuming Gamma Distribution		95% KM (jackknife) UCL N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL N/A
Minimum	N/A	95% KM (BCA) UCL N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL N/A
Mean	N/A	95% KM (Chebyshev) UCL 0.738
Median	N/A	97.5% KM (Chebyshev) UCL 0.871
SD	N/A	99% KM (Chebyshev) UCL 1.132
k star	N/A	
Theta star	N/A	
Nu star	N/A	Potential UCLs to Use
AppChi2	N/A	95% KM (BCA) UCL N/A
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

Benzo(g,h,i)perylene

Warning: There are only 3 Distinct Detected Values in this data set
The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.
Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.
However, results obtained using 4 to 9 distinct values may not be reliable.
It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Benzo(k)fluoranthene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	2
Number of Distinct Detected Data	2 Number of Non-Detect Data	32
	Percent Non-Detects	94.12%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.21 Minimum Detected	-1.561
Maximum Detected	2 Maximum Detected	0.693
Mean of Detected	1.105 Mean of Detected	-0.434
SD of Detected	1.266 SD of Detected	1.594
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.112	Mean -2.845
SD	0.335	SD 0.672
95% DL/2 (t) UCL	0.209	95% H-Stat (DL/2) UCL 0.093
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE method failed to converge properly		Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic	N/A	Nonparametric Statistics
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.263
5% K-S Critical Value	N/A	SD 0.302
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0734
		95% KM (t) UCL 0.387
		95% KM (z) UCL 0.383
Assuming Gamma Distribution		95% KM (jackknife) UCL N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL N/A
Minimum	N/A	95% KM (BCA) UCL N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL N/A
Mean	N/A	95% KM (Chebyshev) UCL 0.582
Median	N/A	97.5% KM (Chebyshev) UCL 0.721
SD	N/A	99% KM (Chebyshev) UCL 0.992
k star	N/A	
Theta star	N/A	
Nu star	N/A	Potential UCLs to Use
AppChi2	N/A	97.5% KM (Chebyshev) UCL 0.721
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

1,1-Biphenyl

General Statistics - Data are in µg/L.

Number of Valid Data	34	Number of Detected Data	2
Number of Distinct Detected Data	2	Number of Non-Detect Data	32
		Percent Non-Detects	94.12%
Raw Statistics		Log-transformed Statistics	
Minimum Detected	1.1	Minimum Detected	0.0953
Maximum Detected	2.3	Maximum Detected	0.833
Mean of Detected	1.7	Mean of Detected	0.464
SD of Detected	0.849	SD of Detected	0.522
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5	Maximum Non-Detect	1.609

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic	N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value	N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	2.453	Mean	0.89
SD	0.242	SD	0.141
95% DL/2 (t) UCL	2.523	95% H-Stat (DL/2) UCL	2.565
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	N/A
		SD in Log Scale	N/A
		Mean in Original Scale	N/A
		SD in Original Scale	N/A
		95% t UCL	N/A
		95% Percentile Bootstrap UCL	N/A
		95% BCA Bootstrap UCL	N/A
		95% H-UCL	N/A
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)	
Theta Star	N/A		
nu star	N/A		
A-D Test Statistic	N/A	Nonparametric Statistics	
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method	
K-S Test Statistic	N/A	Mean	1.7
5% K-S Critical Value	N/A	SD	0.6
Data not Gamma Distributed at 5% Significance Level		SE of Mean	0.6
		95% KM (t) UCL	2.715
		95% KM (z) UCL	2.687
Assuming Gamma Distribution		95% KM (jackknife) UCL	N/A
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL	N/A
Minimum	N/A	95% KM (BCA) UCL	N/A
Maximum	N/A	95% KM (Percentile Bootstrap) UCL	N/A
Mean	N/A	95% KM (Chebyshev) UCL	4.315
Median	N/A	97.5% KM (Chebyshev) UCL	5.447
SD	N/A	99% KM (Chebyshev) UCL	7.67
k star	N/A		
Theta star	N/A		
Nu star	N/A	Potential UCLs to Use	
AppChi2	N/A	95% KM (t) UCL	2.715
95% Gamma Approximate UCL	N/A	95% KM (% Bootstrap) UCL	N/A
95% Adjusted Gamma UCL	N/A		
Warning: Recommended UCL exceeds the maximum observation			
Note: DL/2 is not a recommended method.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Dibenzo(a,h)anthracene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	5
Number of Distinct Detected Data	4 Number of Non-Detect Data	29
	Percent Non-Detects	85.29%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	0.096 Minimum Detected	-2.343
Maximum Detected	5.5 Maximum Detected	1.705
Mean of Detected	1.195 Mean of Detected	-1.377
SD of Detected	2.407 SD of Detected	1.733
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.561 Shapiro Wilk Test Statistic	0.643
5% Shapiro Wilk Critical Value	0.762 5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
Assuming Lognormal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.218 Mean	-2.758
SD	0.934 SD	0.838
95% DL/2 (t) UCL	0.489 95% H-Stat (DL/2) UCL	0.125
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE yields a negative mean	Log ROS Method	
	Mean in Log Scale	-2.838
	SD in Log Scale	1.198
	Mean in Original Scale	0.231
	SD in Original Scale	0.932
	95% t UCL	0.501
	95% Percentile Bootstrap UCL	0.55
	95% BCA Bootstrap UCL	0.718
	95% H-UCL	0.211
Gamma Distribution Test with Detected Values Only		
Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.301 Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.968	
nu star	3.012	
A-D Test Statistic	1.152 Nonparametric Statistics	
5% A-D Critical Value	0.722 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.722 Mean	0.258
5% K-S Critical Value	0.375 SD	0.913
Data not Gamma Distributed at 5% Significance Level	SE of Mean	0.175
	95% KM (t) UCL	0.554
	95% KM (z) UCL	0.545
	95% KM (jackknife) UCL	0.516
	95% KM (bootstrap t) UCL	35.95
	5.5 95% KM (BCA) UCL	0.738
	0.272 95% KM (Percentile Bootstrap) UCL	0.58
	1.00E-06 95% KM (Chebyshev) UCL	1.02
	0.953 97.5% KM (Chebyshev) UCL	1.35
	0.111 99% KM (Chebyshev) UCL	1.999
	2.448	
	7.568 Potential UCLs to Use	
	2.487 97.5% KM (Chebyshev) UCL	1.35
	0.829	
	0.879	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Indeno(1,2,3-cd)pyrene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	6
Number of Distinct Detected Data	4 Number of Non-Detect Data	28
	Percent Non-Detects	82.35%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	0.11 Minimum Detected	-2.207
Maximum Detected	3.1 Maximum Detected	1.131
Mean of Detected	0.643 Mean of Detected	-1.427
SD of Detected	1.205 SD of Detected	1.292
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.532 Shapiro Wilk Test Statistic	0.683
5% Shapiro Wilk Critical Value	0.788 5% Shapiro Wilk Critical Value	0.788
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
Assuming Lognormal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.155 Mean	-2.719
SD	0.522 SD	0.788
95% DL/2 (t) UCL	0.306 95% H-Stat (DL/2) UCL	0.122
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE yields a negative mean	Log ROS Method	
	Mean in Log Scale	-6.196
	SD in Log Scale	3.198
	Mean in Original Scale	0.117
	SD in Original Scale	0.53
	95% t UCL	0.271
	95% Percentile Bootstrap UCL	0.298
	95% BCA Bootstrap UCL	0.394
	95% H-UCL	8.577
Gamma Distribution Test with Detected Values Only		
Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.423 Data do not follow a Discernable Distribution (0.05)	
Theta Star	1.522	
nu star	5.072	
A-D Test Statistic	1.246 Nonparametric Statistics	
5% A-D Critical Value	0.729 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.729 Mean	0.204
5% K-S Critical Value	0.346 SD	0.505
Data not Gamma Distributed at 5% Significance Level	SE of Mean	0.0948
	95% KM (t) UCL	0.365
	95% KM (z) UCL	0.36
	95% KM (jackknife) UCL	0.353
	95% KM (bootstrap t) UCL	5.808
	3.1 95% KM (BCA) UCL	0.379
	0.114 95% KM (Percentile Bootstrap) UCL	0.384
	1.00E-06 95% KM (Chebyshev) UCL	0.617
	0.531 97.5% KM (Chebyshev) UCL	0.796
	0.0992 99% KM (Chebyshev) UCL	1.148
	1.144	
	6.748 Potential UCLs to Use	
	2.034 95% KM (BCA) UCL	0.379
AppChi2		
95% Gamma Approximate UCL	0.377	
95% Adjusted Gamma UCL	0.401	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Naphthalene

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 12
Number of Distinct Detected Data	9	Number of Non-Detect Data 22
		Percent Non-Detects 64.71%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.08	Minimum Detected -2.526
Maximum Detected	6.5	Maximum Detected 1.872
Mean of Detected	1.285	Mean of Detected -1.025
SD of Detected	2.093	SD of Detected 1.632
Minimum Non-Detect	0.1	Minimum Non-Detect -2.303
Maximum Non-Detect	0.1	Maximum Non-Detect -2.303
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.654	Shapiro Wilk Test Statistic 0.783
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value 0.859
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.486	Mean -2.3
SD	1.349	SD 1.342
95% DL/2 (t) UCL	0.877	95% H-Stat (DL/2) UCL 0.486
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -2.589
		SD in Log Scale 1.767
		Mean in Original Scale 0.488
		SD in Original Scale 1.349
		95% t UCL 0.879
		95% Percentile Bootstrap UCL 0.896
		95% BCA Bootstrap UCL 1.064
Gamma Distribution Test with Detected Values Only		
	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.429	Data do not follow a Discernable Distribution (0.05)
Theta Star	2.993	
nu star	10.3	
A-D Test Statistic		
	1.463	Nonparametric Statistics
5% A-D Critical Value	0.785	Kaplan-Meier (KM) Method
K-S Test Statistic	0.785	Mean 0.51
5% K-S Critical Value	0.259	SD 1.321
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.237
		95% KM (t) UCL 0.911
		95% KM (z) UCL 0.9
Assuming Gamma Distribution		95% KM (jackknife) UCL 0.9
Gamma ROS Statistics using Extrapolated Data		95% KM (bootstrap t) UCL 1.757
Minimum	0.08	95% KM (BCA) UCL 1.036
Maximum	6.5	95% KM (Percentile Bootstrap) UCL 0.937
Mean	1.829	95% KM (Chebyshev) UCL 1.542
Median	1.455	97.5% KM (Chebyshev) UCL 1.988
SD	1.567	99% KM (Chebyshev) UCL 2.865
k star	0.952	
Theta star	1.921	
Nu star	64.75	Potential UCLs to Use
AppChi2	47.23	97.5% KM (Chebyshev) UCL 1.988
95% Gamma Approximate UCL	2.507	
95% Adjusted Gamma UCL	2.547	
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Phenanthrene

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	2
Number of Distinct Detected Data	2 Number of Non-Detect Data	32
	Percent Non-Detects	94.12%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	0.13 Minimum Detected	-2.04
Maximum Detected	1.5 Maximum Detected	0.405
Mean of Detected	0.815 Mean of Detected	-0.817
SD of Detected	0.969 SD of Detected	1.729
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.1 Maximum Non-Detect	-2.303

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
Assuming Lognormal Distribution		
DL/2 Substitution Method		
Mean	0.095 Mean	-2.868
SD	0.249 SD	0.601
95% DL/2 (t) UCL	0.167 95% H-Stat (DL/2) UCL	0.0842
Maximum Likelihood Estimate(MLE) Method		
Log ROS Method		
MLE method failed to converge properly	N/A	Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		
Data Distribution Test with Detected Values Only		
k star (bias corrected)	N/A	Data do not follow a Discernable Distribution (0.05)
Theta Star	N/A	
nu star	N/A	
A-D Test Statistic		
Nonparametric Statistics		
5% A-D Critical Value	N/A	Kaplan-Meier (KM) Method
K-S Test Statistic	N/A	Mean 0.17
5% K-S Critical Value	N/A	SD 0.231
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0561
		95% KM (t) UCL 0.265
		95% KM (z) UCL 0.263
Assuming Gamma Distribution		
Gamma ROS Statistics using Extrapolated Data		
Minimum	N/A	95% KM (jackknife) UCL N/A
Maximum	N/A	95% KM (bootstrap t) UCL N/A
Mean	N/A	95% KM (BCA) UCL N/A
Median	N/A	95% KM (Percentile Bootstrap) UCL N/A
SD	N/A	95% KM (Chebyshev) UCL 0.415
k star	N/A	97.5% KM (Chebyshev) UCL 0.521
Theta star	N/A	99% KM (Chebyshev) UCL 0.729
Nu star	N/A	Potential UCLs to Use
AppChi2	N/A	97.5% KM (Chebyshev) UCL 0.521
95% Gamma Approximate UCL	N/A	
95% Adjusted Gamma UCL	N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Total PCB Aroclors

General Statistics - Data are in µg/L.

Number of Valid Data	33	Number of Detected Data	21
Number of Distinct Detected Data	20	Number of Non-Detect Data	12
		Percent Non-Detects	36.36%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.045	Minimum Detected	-3.101
Maximum Detected	81	Maximum Detected	4.394
Mean of Detected	9.885	Mean of Detected	0.664
SD of Detected	18.96	SD of Detected	2.131
Minimum Non-Detect	0.05	Minimum Non-Detect	-2.996
Maximum Non-Detect	0.09	Maximum Non-Detect	-2.408

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	13
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	20
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	39.39%

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Test Statistic	0.561	5% Shapiro Wilk Critical Value	0.908
5% Shapiro Wilk Critical Value	0.908	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	6.305	Mean	-0.776
SD	15.74	SD	2.571
95% DL/2 (t) UCL	10.95	95% H-Stat (DL/2) UCL	108.9

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-1.001
		SD in Log Scale	2.903
		Mean in Original Scale	6.304
		SD in Original Scale	15.74
		95% t UCL	10.95
		95% Percentile Bootstrap UCL	11.21
		95% BCA Bootstrap UCL	13.01
		95% H-UCL	374.8

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.378	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	26.16		
nu star	15.87		

A-D Test Statistic	0.589	Nonparametric Statistics	
5% A-D Critical Value	0.825	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.825	Mean	6.307
5% K-S Critical Value	0.203	SD	15.5
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	2.765

Assuming Gamma Distribution		95% KM (t) UCL	10.99
Gamma ROS Statistics using Extrapolated Data		95% KM (z) UCL	10.86
Minimum	1.00E-06	95% KM (jackknife) UCL	10.93
Maximum	81	95% KM (bootstrap t) UCL	18.19
Mean	6.291	95% KM (BCA) UCL	11.72
Median	0.328	95% KM (Percentile Bootstrap) UCL	11.3
SD	15.75	95% KM (Chebyshev) UCL	18.36
k star	0.132	97.5% KM (Chebyshev) UCL	23.58
Theta star	47.73	99% KM (Chebyshev) UCL	33.82
Nu star	8.699	Potential UCLs to Use	
AppChi2	3.146	95% KM (BCA) UCL	11.72
95% Gamma Approximate UCL	17.39		
95% Adjusted Gamma UCL	18.39		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

alpha-BHC

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 9
Number of Distinct Detected Data	7	Number of Non-Detect Data 25
		Percent Non-Detects 73.53%
Raw Statistics		Log-transformed Statistics
Minimum Detected	0.14	Minimum Detected -1.966
Maximum Detected	2.7	Maximum Detected 0.993
Mean of Detected	0.753	Mean of Detected -0.895
SD of Detected	0.901	SD of Detected 1.147
Minimum Non-Detect	0.05	Minimum Non-Detect -2.996
Maximum Non-Detect	0.056	Maximum Non-Detect -2.882
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 25
Observations < Largest ND are treated as NDs		Number treated as Detected 9
		Single DL Non-Detect Percentage 73.53%
Warning: There are only 9 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.745	Shapiro Wilk Test Statistic 0.848
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value 0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.218	Mean -2.934
SD	0.551	SD 1.365
95% DL/2 (t) UCL	0.378	95% H-Stat (DL/2) UCL 0.271
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -4.125
		SD in Log Scale 2.432
		Mean in Original Scale 0.208
		SD in Original Scale 0.554
		95% t UCL 0.369
		95% Percentile Bootstrap UCL 0.372
		95% BCA Bootstrap UCL 0.44
		95% H-UCL 2.138
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.707	Data appear Lognormal at 5% Significance Level
Theta Star	1.065	
nu star	12.73	
A-D Test Statistic		0.781 Nonparametric Statistics
5% A-D Critical Value	0.745	Kaplan-Meier (KM) Method
K-S Test Statistic	0.745	Mean 0.302
5% K-S Critical Value	0.287	SD 0.514
Data not Gamma Distributed at 5% Significance Level		SE of Mean 0.0935
		95% KM (t) UCL 0.461
		95% KM (z) UCL 0.456
		95% KM (jackknife) UCL 0.454
		95% KM (bootstrap t) UCL 0.647
		95% KM (BCA) UCL 0.491
		95% KM (Percentile Bootstrap) UCL 0.484
		95% KM (Chebyshev) UCL 0.71
		97.5% KM (Chebyshev) UCL 0.886
		99% KM (Chebyshev) UCL 1.233
		1.906
		7.116 Potential UCLs to Use
		95% KM (BCA) UCL 0.491
		2.234
		0.635
		0.675
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

delta-BHC

General Statistics (µg/L)		
Number of Valid Data	31 Number of Detected Data	2
Number of Distinct Detected Data	2 Number of Non-Detect Data	29
	Percent Non-Detects	93.55%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.34 Minimum Detected	-1.079
Maximum Detected	3.6 Maximum Detected	1.281
Mean of Detected	1.97 Mean of Detected	0.101
SD of Detected	2.305 SD of Detected	1.669
Minimum Non-Detect	0.025 Minimum Non-Detect	-3.689
Maximum Non-Detect	0.056 Maximum Non-Detect	-2.882
Note: Data have multiple DLs - Use of KM Method is recommended		
	Number treated as Non-Detect	29
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	2
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	93.55%

Warning: Data set has only 2 Distinct Detected Values.

This may not be adequate enough to compute meaningful and reliable test statistics and estimates.

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

Unless Data Quality Objectives (DQOs) have been met, it is suggested to collect additional observations.

The number of detected data may not be adequate enough to perform GOF tests, bootstrap, and ROS methods.

Those methods will return a 'N/A' value on your output display!

It is necessary to have 4 or more Distinct Values for bootstrap methods.

However, results obtained using 4 to 9 distinct values may not be reliable.

It is recommended to have 10 to 15 or more observations for accurate and meaningful results and estimates.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	N/A	Shapiro Wilk Test Statistic N/A
5% Shapiro Wilk Critical Value	N/A	5% Shapiro Wilk Critical Value N/A
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		Assuming Lognormal Distribution
		DL/2 Substitution Method
Mean	0.151	Mean -3.447
SD	0.643	SD 1.004
95% DL/2 (t) UCL	0.347	95% H-Stat (DL/2) UCL 0.0822
Maximum Likelihood Estimate(MLE) Method N/A		
MLE method failed to converge properly		Log ROS Method
		Mean in Log Scale N/A
		SD in Log Scale N/A
		Mean in Original Scale N/A
		SD in Original Scale N/A
		95% t UCL N/A
		95% Percentile Bootstrap UCL N/A
		95% BCA Bootstrap UCL N/A
		95% H-UCL N/A
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	N/A	Data Distribution Test with Detected Values Only
Theta Star	N/A	Data do not follow a Discernable Distribution (0.05)
nu star	N/A	
A-D Test Statistic N/A		
5% A-D Critical Value	N/A	Nonparametric Statistics
K-S Test Statistic	N/A	Kaplan-Meier (KM) Method
5% K-S Critical Value	N/A	Mean 0.445
Data not Gamma Distributed at 5% Significance Level		SD 0.576
		SE of Mean 0.146
		95% KM (t) UCL 0.693
		95% KM (z) UCL 0.686
		95% KM (jackknife) UCL 2.581
		95% KM (bootstrap t) UCL 0.445
		95% KM (BCA) UCL N/A
		95% KM (Percentile Bootstrap) UCL N/A
		95% KM (Chebyshev) UCL 1.083
		97.5% KM (Chebyshev) UCL 1.359
		99% KM (Chebyshev) UCL 1.901
		Theta star N/A
		Nu star N/A
		Potential UCLs to Use
		97.5% KM (Chebyshev) UCL 1.359
		AppChi2
		95% Gamma Approximate UCL N/A
		95% Adjusted Gamma UCL N/A
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

gamma-BHC

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 4
Number of Distinct Detected Data	4	Number of Non-Detect Data 30
		Percent Non-Detects 88.24%
Raw Statistics		Log-transformed Statistics
Minimum Detected	0.065	Minimum Detected -2.733
Maximum Detected	1.3	Maximum Detected 0.262
Mean of Detected	0.579	Mean of Detected -1.011
SD of Detected	0.53	SD of Detected 1.273
Minimum Non-Detect	0.05	Minimum Non-Detect -2.996
Maximum Non-Detect	0.056	Maximum Non-Detect -2.882
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 30
Observations < Largest ND are treated as NDs		Number treated as Detected 4
		Single DL Non-Detect Percentage 88.24%
Warning: There are only 4 Distinct Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Test Statistic 0.957
5% Shapiro Wilk Critical Value	0.748	5% Shapiro Wilk Critical Value 0.748
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.0906	Mean -3.355
SD	0.241	SD 0.95
95% DL/2 (t) UCL	0.161	95% H-Stat (DL/2) UCL 0.0814
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -7.502
		SD in Log Scale 3.463
		Mean in Original Scale 0.0701
		SD in Original Scale 0.247
		95% t UCL 0.142
		95% Percentile Bootstrap UCL 0.145
		95% BCA Bootstrap UCL 0.19
		95% H-UCL 9.579
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.471	Data appear Normal at 5% Significance Level
Theta Star	1.229	
nu star	3.767	
A-D Test Statistic		0.202 Nonparametric Statistics
5% A-D Critical Value		0.665 Kaplan-Meier (KM) Method
K-S Test Statistic		0.665 Mean 0.125
5% K-S Critical Value		0.401 SD 0.228
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.0452
		95% KM (t) UCL 0.202
		95% KM (z) UCL 0.2
		95% KM (jackknife) UCL 0.302
		95% KM (bootstrap t) UCL 0.207
		95% KM (BCA) UCL N/A
		95% KM (Percentile Bootstrap) UCL 0.671
		95% KM (Chebyshev) UCL 0.323
		97.5% KM (Chebyshev) UCL 0.408
		99% KM (Chebyshev) UCL 0.575
Assuming Gamma Distribution		
Gamma ROS Statistics using Extrapolated Data		
Minimum	1.00E-06	95% KM (bootstrap t) UCL 0.207
Maximum	1.3	95% KM (BCA) UCL N/A
Mean	0.0681	95% KM (Percentile Bootstrap) UCL 0.671
Median	1.00E-06	95% KM (Chebyshev) UCL 0.323
SD	0.248	97.5% KM (Chebyshev) UCL 0.408
k star	0.098	99% KM (Chebyshev) UCL 0.575
Theta star	0.695	
Nu star	6.664	Potential UCLs to Use
AppChi2	1.988	95% KM (t) UCL 0.202
95% Gamma Approximate UCL	0.228	95% KM (Percentile Bootstrap) UCL 0.671
95% Adjusted Gamma UCL	N/A	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

gamma-Chlordane

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	7
Number of Distinct Detected Data	7 Number of Non-Detect Data	27
	Percent Non-Detects	79.41%

Raw Statistics	Log-transformed Statistics	
Minimum Detected	0.072 Minimum Detected	-2.631
Maximum Detected	21 Maximum Detected	3.045
Mean of Detected	4.5 Mean of Detected	-0.0205
SD of Detected	7.774 SD of Detected	1.997
Minimum Non-Detect	0.05 Minimum Non-Detect	-2.996
Maximum Non-Detect	0.056 Maximum Non-Detect	-2.882

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	7
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	79.41%

Warning: There are only 7 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics	Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only	0.661 Shapiro Wilk Test Statistic	0.954
Shapiro Wilk Test Statistic	0.803 5% Shapiro Wilk Critical Value	0.803
5% Shapiro Wilk Critical Value	Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level		

Assuming Normal Distribution	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.947 Mean	-2.914
SD	3.79 SD	1.721
95% DL/2 (t) UCL	2.047 95% H-Stat (DL/2) UCL	0.669

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-7.087
		SD in Log Scale	4.642
		Mean in Original Scale	0.928
		SD in Original Scale	3.794
		95% t UCL	2.029
		95% Percentile Bootstrap UCL	2.153
		95% BCA Bootstrap UCL	2.831
		95% H-UCL	30937

Gamma Distribution Test with Detected Values Only	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.339 Data appear Gamma Distributed at 5% Significance Level	
Theta Star	13.26	
nu star	4.75	

A-D Test Statistic	0.486 Nonparametric Statistics	
5% A-D Critical Value	0.763 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.763 Mean	0.984
5% K-S Critical Value	0.33 SD	3.725
Data appear Gamma Distributed at 5% Significance Level	SE of Mean	0.69

Assuming Gamma Distribution	95% KM (t) UCL		2.151
Gamma ROS Statistics using Extrapolated Data	95% KM (z) UCL		2.119
Minimum	1.00E-06 95% KM (jackknife) UCL		1.966
Maximum	21 95% KM (bootstrap t) UCL		13.21
Mean	0.927 95% KM (BCA) UCL		2.741
Median	1.00E-06 95% KM (Percentile Bootstrap) UCL		2.436
SD	3.795 95% KM (Chebyshev) UCL		3.991
k star	0.0897 99% KM (Chebyshev) UCL		5.292
Theta star	10.33		7.848
Nu star	6.1 Potential UCLs to Use		
AppChi2	1.691 95% KM (t) UCL		2.151
95% Gamma Approximate UCL	3.342		
95% Adjusted Gamma UCL	3.578		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

4,4'-DDD

General Statistics (µg/L)		
Number of Valid Data	15	Number of Detected Data 6
Number of Distinct Detected Data	6	Number of Non-Detect Data 9
		Percent Non-Detects 60.00%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.09	Minimum Detected -2.408
Maximum Detected	2.2	Maximum Detected 0.788
Mean of Detected	0.667	Mean of Detected -0.951
SD of Detected	0.786	SD of Detected 1.168
Minimum Non-Detect	0.1	Minimum Non-Detect -2.303
Maximum Non-Detect	0.11	Maximum Non-Detect -2.207
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 10
Observations < Largest ND are treated as NDs		Number treated as Detected 5
		Single DL Non-Detect Percentage 66.67%
Warning: There are only 6 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.751	Shapiro Wilk Test Statistic 0.956
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value 0.788
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		
DL/2 Substitution Method		
Mean	0.298	Mean -2.159
SD	0.564	SD 1.237
95% DL/2 (t) UCL	0.554	95% H-Stat (DL/2) UCL 0.701
Assuming Lognormal Distribution		
DL/2 Substitution Method		
Mean		Mean -2.123
SD		SD in Log Scale 1.342
		Mean in Original Scale 0.308
		SD in Original Scale 0.56
		95% t UCL 0.563
		95% Percentile Bootstrap UCL 0.567
		95% BCA Bootstrap UCL 0.742
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.637	Data appear Gamma Distributed at 5% Significance Level
Theta Star	1.047	
nu star	7.641	
A-D Test Statistic		
5% A-D Critical Value	0.319	Nonparametric Statistics
K-S Test Statistic	0.714	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.714	Mean 0.321
Data appear Gamma Distributed at 5% Significance Level	0.341	SD 0.535
		SE of Mean 0.151
		95% KM (t) UCL 0.587
		95% KM (z) UCL 0.569
		95% KM (jackknife) UCL 0.557
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 0.902
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 0.831
Minimum	1.00E-12	95% KM (Percentile Bootstrap) UCL 0.669
Maximum	2.236	95% KM (Chebyshev) UCL 0.98
Mean	0.814	97.5% KM (Chebyshev) UCL 1.265
Median	0.62	99% KM (Chebyshev) UCL 1.825
SD	0.78	Potential UCLs to Use
k star	0.289	95% KM (t) UCL 0.587
Theta star	2.815	
Nu star	8.671	
AppChi2	3.129	
95% Gamma Approximate UCL	2.254	
95% Adjusted Gamma UCL	2.581	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

4,4'-DDE

General Statistics (µg/L)		
Number of Valid Data	31 Number of Detected Data	8
Number of Distinct Detected Data	8 Number of Non-Detect Data	23
	Percent Non-Detects	74.19%
Raw Statistics		
Minimum Detected	0.085	Minimum Detected -2.465
Maximum Detected	9.8	Maximum Detected 2.282
Mean of Detected	2.462	Mean of Detected -0.239
SD of Detected	3.567	SD of Detected 1.755
Minimum Non-Detect	0.1	Minimum Non-Detect -2.303
Maximum Non-Detect	0.11	Maximum Non-Detect -2.207
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended		
Number treated as Non-Detect	24	
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	7
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	77.42%

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.725	Shapiro Wilk Test Statistic 0.942
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value 0.818
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.673	Mean -2.275
SD	2.03	SD 1.486
95% DL/2 (t) UCL	1.292	95% H-Stat (DL/2) UCL 0.712
Maximum Likelihood Estimate(MLE) Method N/A		Log ROS Method
MLE yields a negative mean		Mean in Log Scale -2.757
		SD in Log Scale 2.174
		Mean in Original Scale 0.681
		SD in Original Scale 2.028
		95% t UCL 1.299
		95% Percentile Bootstrap UCL 1.33
		95% BCA Bootstrap UCL 1.682
		95% H-UCL 3.406
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.427	Data appear Gamma Distributed at 5% Significance Level
Theta Star	5.77	
nu star	6.827	
A-D Test Statistic		0.375 Nonparametric Statistics
5% A-D Critical Value	0.759	Kaplan-Meier (KM) Method
K-S Test Statistic	0.759	Mean 0.698
5% K-S Critical Value	0.308	SD 1.989
Data appear Gamma Distributed at 5% Significance Level	SE of Mean 0.382	
		95% KM (t) UCL 1.346
		95% KM (z) UCL 1.326
		95% KM (jackknife) UCL 1.293
		95% KM (bootstrap t) UCL 4.008
		95% KM (BCA) UCL 1.715
		95% KM (Percentile Bootstrap) UCL 1.485
		95% KM (Chebyshev) UCL 2.363
		97.5% KM (Chebyshev) UCL 3.083
		99% KM (Chebyshev) UCL 4.498
Theta star		6.521
Nu star		6.412 Potential UCLs to Use
AppChi2		1.854 95% KM (t) UCL 1.346
95% Gamma Approximate UCL		2.333
95% Adjusted Gamma UCL		2.512

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

4,4'-DDT

General Statistics (µg/L)				
Number of Valid Data	30	Number of Detected Data	9	
Number of Distinct Detected Data	9	Number of Non-Detect Data	21	
		Percent Non-Detects	70.00%	
Raw Statistics		Log-transformed Statistics		
Minimum Detected	0.13	Minimum Detected	-2.04	
Maximum Detected	36	Maximum Detected	3.584	
Mean of Detected	6.826	Mean of Detected	0.341	
SD of Detected	12.2	SD of Detected	1.976	
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303	
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207	
Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	21	
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	9	
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	70.00%	
Warning: There are only 9 Detected Values in this data				
Note: It should be noted that even though bootstrap may be performed on this data set				
the resulting calculations may not be reliable enough to draw conclusions				
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.				
UCL Statistics				
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.634	Shapiro Wilk Test Statistic	0.938	
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829	
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level		
Assuming Normal Distribution		Assuming Lognormal Distribution		
DL/2 Substitution Method		DL/2 Substitution Method		
Mean	2.083	Mean	-1.988	
SD	7.142	SD	1.866	
95% DL/2 (t) UCL	4.299	95% H-Stat (DL/2) UCL	2.84	
Maximum Likelihood Estimate(MLE) Method		Log ROS Method		
MLE yields a negative mean	N/A	Mean in Log Scale	-4.835	
		SD in Log Scale	4.313	
		Mean in Original Scale	2.053	
		SD in Original Scale	7.151	
		95% t UCL	4.271	
		95% Percentile Bootstrap UCL	4.344	
		95% BCA Bootstrap UCL	5.926	
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.35	Data appear Gamma Distributed at 5% Significance Level		
Theta Star	19.49			
nu star	6.303			
A-D Test Statistic		0.581 Nonparametric Statistics		
5% A-D Critical Value	0.786	Kaplan-Meier (KM) Method		
K-S Test Statistic	0.786	Mean		2.139
5% K-S Critical Value	0.297	SD		7.006
Data appear Gamma Distributed at 5% Significance Level		SE of Mean		1.357
		95% KM (t) UCL		4.444
		95% KM (z) UCL		4.37
		95% KM (jackknife) UCL		4.324
		95% KM (bootstrap t) UCL		17.3
		95% KM (BCA) UCL		4.697
		95% KM (Percentile Bootstrap) UCL		4.583
		95% KM (Chebyshev) UCL		8.052
		97.5% KM (Chebyshev) UCL		10.61
		99% KM (Chebyshev) UCL		15.64
		347		
		9.133 Potential UCLs to Use		
		3.407 95% KM (t) UCL		4.444
		141.6		
		150.4		
Note: DL/2 is not a recommended method.				

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Dieldrin

General Statistics (µg/L)		
Number of Valid Data	31 Number of Detected Data	4
Number of Distinct Detected Data	4 Number of Non-Detect Data	27
	Percent Non-Detects	87.10%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.19	Minimum Detected	-1.661
Maximum Detected	3.1	Maximum Detected	1.131
Mean of Detected	0.96	Mean of Detected	-0.797
SD of Detected	1.429	SD of Detected	1.315
Minimum Non-Detect	0.1	Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11	Maximum Non-Detect	-2.207

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	27
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	87.10%

Warning: There are only 4 Distinct Detected Values in this data
 Note: It should be noted that even though bootstrap may be performed on this data set
 the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		Lognormal Distribution Test with Detected Values Only	
Normal Distribution Test with Detected Values Only		0.67 Shapiro Wilk Test Statistic	0.781
Shapiro Wilk Test Statistic		0.748 5% Shapiro Wilk Critical Value	0.748
5% Shapiro Wilk Critical Value		Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.168	Mean	-2.697
SD	0.548	SD	0.852
95% DL/2 (t) UCL	0.335	95% H-Stat (DL/2) UCL	0.138

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	-7.312
		SD in Log Scale	3.826
		Mean in Original Scale	0.127
		SD in Original Scale	0.557
		95% t UCL	0.297
		95% Percentile Bootstrap UCL	0.321
		95% BCA Bootstrap UCL	0.519
		95% H-UCL	111

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.363	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	2.643		
nu star	2.906		

A-D Test Statistic		0.692 Nonparametric Statistics	
5% A-D Critical Value		0.67 Kaplan-Meier (KM) Method	
K-S Test Statistic		0.67 Mean	0.289
5% K-S Critical Value		0.405 SD	0.514
Data follow Appr. Gamma Distribution at 5% Significance Level		SE of Mean	0.107
		95% KM (t) UCL	0.47
		95% KM (z) UCL	0.465
		95% KM (jackknife) UCL	0.441
		95% KM (bootstrap t) UCL	2.046
		95% KM (BCA) UCL	3.1
		95% KM (Percentile Bootstrap) UCL	0.616
		95% KM (Chebyshev) UCL	0.754
		97.5% KM (Chebyshev) UCL	0.955
		99% KM (Chebyshev) UCL	1.35
		1.288	
		5.965 Potential UCLs to Use	
		1.622 95% KM (t) UCL	0.47
		0.456	
		N/A	

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
 These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
 For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Endosulfan II

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	5
Number of Distinct Detected Data	5 Number of Non-Detect Data	29
	Percent Non-Detects	85.29%
Raw Statistics		
Minimum Detected	0.17	Minimum Detected -1.772
Maximum Detected	8.5	Maximum Detected 2.14
Mean of Detected	3.076	Mean of Detected 0.00787
SD of Detected	3.879	SD of Detected 1.851
Minimum Non-Detect	0.1	Minimum Non-Detect -2.303
Maximum Non-Detect	0.11	Maximum Non-Detect -2.207
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Non-Detect	29
Observations < Largest ND are treated as NDs	Number treated as Detected	5
	Single DL Non-Detect Percentage	85.29%
Warning: There are only 5 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.794 Shapiro Wilk Test Statistic	0.852
5% Shapiro Wilk Critical Value	0.762 5% Shapiro Wilk Critical Value	0.762
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	Assuming Lognormal Distribution	
Mean	DL/2 Substitution Method	
SD	0.496 Mean	-2.54
95% DL/2 (t) UCL	1.734 SD	1.253
	0.999 95% H-Stat (DL/2) UCL	0.317
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE yields a negative mean	Log ROS Method	
	Mean in Log Scale	-8.271
	SD in Log Scale	5.088
	Mean in Original Scale	0.455
	SD in Original Scale	1.745
	95% t UCL	0.961
	95% Percentile Bootstrap UCL	0.972
	95% BCA Bootstrap UCL	1.29
	95% H-UCL	309359
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	Data Distribution Test with Detected Values Only	
Theta Star	0.357 Data appear Normal at 5% Significance Level	
nu star	8.612	
	3.572	
A-D Test Statistic		
5% A-D Critical Value	0.514 Nonparametric Statistics	
K-S Test Statistic	0.708 Kaplan-Meier (KM) Method	
5% K-S Critical Value	0.708 Mean	0.597
Data appear Gamma Distributed at 5% Significance Level	0.37 SD	1.682
	SE of Mean	0.323
	95% KM (t) UCL	1.143
	95% KM (z) UCL	1.128
	95% KM (jackknife) UCL	1.071
	95% KM (bootstrap t) UCL	6.905
	8.5 95% KM (BCA) UCL	6.129
	0.452 95% KM (Percentile Bootstrap) UCL	1.773
	1.00E-06 95% KM (Chebyshev) UCL	2.003
	1.746 97.5% KM (Chebyshev) UCL	2.612
	0.0892 99% KM (Chebyshev) UCL	3.807
	5.072	
	6.065 Potential UCLs to Use	
	1.673 95% KM (t) UCL	1.143
	1.64 95% KM (Percentile Bootstrap) UCL	1.773
	1.756	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Endosulfan sulfate

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	5
Number of Distinct Detected Data	5 Number of Non-Detect Data	29
	Percent Non-Detects	85.29%
Raw Statistics		
Minimum Detected	0.078	Minimum Detected -2.551
Maximum Detected	3.1	Maximum Detected 1.131
Mean of Detected	1.19	Mean of Detected -0.81
SD of Detected	1.447	SD of Detected 1.71
Minimum Non-Detect	0.1	Minimum Non-Detect -2.303
Maximum Non-Detect	0.11	Maximum Non-Detect -2.207
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended		
Number treated as Non-Detect		30
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	88.24%
Warning: There are only 5 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set		
the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.781	Shapiro Wilk Test Statistic 0.86
5% Shapiro Wilk Critical Value	0.762	5% Shapiro Wilk Critical Value 0.762
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Lognormal Distribution Test with Detected Values Only		
Assuming Normal Distribution		
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.218	Mean -2.66
SD	0.649	SD 0.982
95% DL/2 (t) UCL	0.407	95% H-Stat (DL/2) UCL 0.171
Assuming Lognormal Distribution		
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -2.801
		SD in Log Scale 1.495
		Mean in Original Scale 0.239
		SD in Original Scale 0.648
		95% t UCL 0.427
		95% Percentile Bootstrap UCL 0.434
		95% BCA Bootstrap UCL 0.546
		95% H-UCL 0.417
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.383	Data appear Normal at 5% Significance Level
Theta Star	3.105	
nu star	3.831	
Data Distribution Test with Detected Values Only		
A-D Test Statistic	0.534	Nonparametric Statistics
5% A-D Critical Value	0.705	Kaplan-Meier (KM) Method
K-S Test Statistic	0.705	Mean 0.241
5% K-S Critical Value	0.369	SD 0.634
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.121
		95% KM (t) UCL 0.447
		95% KM (z) UCL 0.441
		95% KM (jackknife) UCL 0.404
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 2.53
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 3.1
Minimum	1.00E-06	95% KM (Percentile Bootstrap) UCL 0.691
Maximum	3.1	95% KM (Chebyshev) UCL 0.771
Mean	0.315	97.5% KM (Chebyshev) UCL 1
Median	1.00E-06	99% KM (Chebyshev) UCL 1.45
SD	0.682	
k star	0.123	Potential UCLs to Use
Theta star	2.547	95% KM (t) UCL 0.447
Nu star	8.396	95% KM (Percentile Bootstrap) UCL 0.691
AppChi2	2.966	
95% Gamma Approximate UCL	0.89	
95% Adjusted Gamma UCL	0.94	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Endrin aldehyde

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	4
Number of Distinct Detected Data	4 Number of Non-Detect Data	30
	Percent Non-Detects	88.24%
Raw Statistics		
Minimum Detected	0.11 Minimum Detected	-2.207
Maximum Detected	5.7 Maximum Detected	1.74
Mean of Detected	2.495 Mean of Detected	-0.104
SD of Detected	2.762 SD of Detected	1.951
Minimum Non-Detect	0.1 Minimum Non-Detect	-2.303
Maximum Non-Detect	0.11 Maximum Non-Detect	-2.207
Log-transformed Statistics		
Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	30
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	4
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	88.24%
Warning: There are only 4 Distinct Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.865 Shapiro Wilk Test Statistic	0.874
5% Shapiro Wilk Critical Value	0.748 5% Shapiro Wilk Critical Value	0.748
Data appear Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.338 Mean	-2.641
SD	1.154 SD	1.11
95% DL/2 (t) UCL	0.673 95% H-Stat (DL/2) UCL	0.217
Assuming Lognormal Distribution		
Maximum Likelihood Estimate(MLE) Method	N/A Log ROS Method	
MLE yields a negative mean	Mean in Log Scale	-10.12
	SD in Log Scale	5.741
	Mean in Original Scale	0.295
	SD in Original Scale	1.166
	95% t UCL	0.633
	95% Percentile Bootstrap UCL	0.628
	95% BCA Bootstrap UCL	0.802
	95% H-UCL	14099972
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.318 Data appear Normal at 5% Significance Level	
Theta Star	7.842	
nu star	2.545	
Data Distribution Test with Detected Values Only		
A-D Test Statistic	0.432 Nonparametric Statistics	
5% A-D Critical Value	0.676 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.676 Mean	0.391
5% K-S Critical Value	0.408 SD	1.124
Data appear Gamma Distributed at 5% Significance Level	SE of Mean	0.223
	95% KM (t) UCL	0.767
	95% KM (z) UCL	0.757
Assuming Gamma Distribution	95% KM (jackknife) UCL	0.666
Gamma ROS Statistics using Extrapolated Data	95% KM (bootstrap t) UCL	0.686
Minimum	1.00E-06 95% KM (BCA) UCL	N/A
Maximum	5.7 95% KM (Percentile Bootstrap) UCL	4.006
Mean	0.294 95% KM (Chebyshev) UCL	1.361
Median	1.00E-06 97.5% KM (Chebyshev) UCL	1.781
SD	1.166 99% KM (Chebyshev) UCL	2.605
k star	0.0893	
Theta star	3.289	
Nu star	6.07 Potential UCLs to Use	
AppChi2	1.676 95% KM (t) UCL	0.767
95% Gamma Approximate UCL	1.063 95% KM (Percentile Bootstrap) UCL	4.006
95% Adjusted Gamma UCL	N/A	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Heptachlor

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 9
Number of Distinct Detected Data	9	Number of Non-Detect Data 25
		Percent Non-Detects 73.53%
Raw Statistics		Log-transformed Statistics
Minimum Detected	0.0615	Minimum Detected -2.789
Maximum Detected	5.1	Maximum Detected 1.629
Mean of Detected	1.709	Mean of Detected -0.285
SD of Detected	1.95	SD of Detected 1.528
Minimum Non-Detect	0.05	Minimum Non-Detect -2.996
Maximum Non-Detect	0.056	Maximum Non-Detect -2.882
Note: Data have multiple DLs - Use of KM Method is recommended		
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Non-Detect 25
Observations < Largest ND are treated as NDs		Number treated as Detected 9
		Single DL Non-Detect Percentage 73.53%
Warning: There are only 9 Detected Values in this data		
Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions		
It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.		
UCL Statistics		
Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic 0.946
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value 0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level
Assuming Normal Distribution		Assuming Lognormal Distribution
DL/2 Substitution Method		DL/2 Substitution Method
Mean	0.471	Mean -2.774
SD	1.221	SD 1.692
95% DL/2 (t) UCL	0.826	95% H-Stat (DL/2) UCL 0.712
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -4.48
		SD in Log Scale 3.172
		Mean in Original Scale 0.459
		SD in Original Scale 1.225
		95% t UCL 0.815
		95% Percentile Bootstrap UCL 0.803
		95% BCA Bootstrap UCL 0.898
		95% H-UCL 41.87
Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	0.562	Data appear Gamma Distributed at 5% Significance Level
Theta Star	3.043	
nu star	10.11	
A-D Test Statistic	0.341	Nonparametric Statistics
5% A-D Critical Value	0.753	Kaplan-Meier (KM) Method
K-S Test Statistic	0.753	Mean 0.498
5% K-S Critical Value	0.29	SD 1.193
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.217
		95% KM (t) UCL 0.865
		95% KM (z) UCL 0.855
		95% KM (jackknife) UCL 0.808
		95% KM (bootstrap t) UCL 1.192
		95% KM (BCA) UCL 1.105
		95% KM (Percentile Bootstrap) UCL 0.96
		95% KM (Chebyshev) UCL 1.444
		97.5% KM (Chebyshev) UCL 1.853
		99% KM (Chebyshev) UCL 2.657
		Potential UCLs to Use
		95% KM (t) UCL 0.865
		95% Gamma Approximate UCL 1.5
		95% Adjusted Gamma UCL 1.599
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

2,3,7,8-TCDD Toxic Equivalence TEQ (pg/L)

General Statistics - Data are in pg/L.

Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		Log-transformed Statistics	
Minimum	8.10E-04	Minimum of Log Data	-7.118
Maximum	54	Maximum of Log Data	3.989
Mean	17.7	Mean of log Data	1.279
Median	10.66	SD of log Data	3.294
SD	19.66		
Std. Error of Mean	6.218		
Coefficient of Variation	1.111		
Skewness	0.912		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		0.837 Shapiro Wilk Test Statistic	0.763
Shapiro Wilk Test Statistic		0.842 Shapiro Wilk Critical Value	0.842
Shapiro Wilk Critical Value		Data not Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	29.09	95% H-UCL	10315140
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	720.3
95% Adjusted-CLT UCL (Chen-1995)	29.84	97.5% Chebyshev (MVUE) UCL	968.1
95% Modified-t UCL (Johnson-1978)	29.39	99% Chebyshev (MVUE) UCL	1455
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	0.354	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	49.93		
MLE of Mean	17.7		
MLE of Standard Deviation	29.72		
nu star	7.088		
Approximate Chi Square Value (.05)	2.219	Nonparametric Statistics	
Adjusted Level of Significance	0.0267	95% CLT UCL	27.92
Adjusted Chi Square Value	1.776	95% Jackknife UCL	29.09
		95% Standard Bootstrap UCL	27.32
Anderson-Darling Test Statistic	0.368	95% Bootstrap-t UCL	32.27
Anderson-Darling 5% Critical Value	0.793	95% Hall's Bootstrap UCL	27.05
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	28.16
Kolmogorov-Smirnov 5% Critical Value	0.284	95% BCA Bootstrap UCL	29.23
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	44.8
		97.5% Chebyshev(Mean, Sd) UCL	56.53
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	79.57
95% Approximate Gamma UCL	56.52		
95% Adjusted Gamma UCL	70.6		
Potential UCL to Use		Use 95% Adjusted Gamma UCL	(pg/L) 70.6
Recommended UCL exceeds the maximum observation			(µg/L) 7.06E-05

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Aluminium

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 26
Number of Distinct Detected Data	25	Number of Non-Detect Data 8
		Percent Non-Detects 23.53%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	71.3	Minimum Detected 4.267
Maximum Detected	6210	Maximum Detected 8.734
Mean of Detected	754.7	Mean of Detected 5.885
SD of Detected	1279	SD of Detected 1.13
Minimum Non-Detect	200	Minimum Non-Detect 5.298
Maximum Non-Detect	200	Maximum Non-Detect 5.298
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.544	Shapiro Wilk Test Statistic 0.938
5% Shapiro Wilk Critical Value	0.92	5% Shapiro Wilk Critical Value 0.92
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	600.6	Mean 5.584
SD	1149	SD 1.127
95% DL/2 (t) UCL	934	95% H-Stat (DL/2) UCL 836.9
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale 5.645
		SD in Log Scale 1.112
		Mean in Original Scale 612.4
		SD in Original Scale 1144
		95% t UCL 944.4
		95% Percentile Bootstrap UCL 978.5
		95% BCA Bootstrap UCL 1125
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.734	Data Distribution Test with Detected Values Only
Theta Star	1029	Data appear Lognormal at 5% Significance Level
nu star	38.15	
A-D Test Statistic		
5% A-D Critical Value	0.782	Nonparametric Statistics
K-S Test Statistic	0.782	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.178	Mean 610.3
Data not Gamma Distributed at 5% Significance Level		SD 1128
		SE of Mean 197.3
		95% KM (t) UCL 944.2
		95% KM (z) UCL 934.8
		95% KM (jackknife) UCL 942.6
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 1369
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 975.5
Minimum	1.00E-12	95% KM (Percentile Bootstrap) UCL 959.5
Maximum	6210	95% KM (Chebyshev) UCL 1470
Mean	669.6	97.5% KM (Chebyshev) UCL 1842
Median	287.8	99% KM (Chebyshev) UCL 2573
SD	1143	
k star	0.209	
Theta star	3209	
Nu star	14.19	Potential UCLs to Use
AppChi2	6.701	97.5% KM (Chebyshev) UCL 1842
95% Gamma Approximate UCL	1418	
95% Adjusted Gamma UCL	1474	
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Arsenic

General Statistics (µg/L)		
Number of Valid Observations	34	Number of Distinct Observations23
Raw Statistics		
Minimum	0.68	Log-transformed StatisticsMinimum of Log Data-0.386
Maximum	829	Maximum of Log Data6.72
Mean	33.65	Mean of log Data1.317
Median	1.85	SD of log Data1.576
SD	142	
Coefficient of Variation	4.22	
Skewness	5.649	
Relevant UCL Statistics		
Normal Distribution Test		
Shapiro Wilk Test Statistic	0.245	Shapiro Wilk Test Statistic0.798
Shapiro Wilk Critical Value	0.933	Shapiro Wilk Critical Value0.933
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
95% Student's-t UCL	74.87	95% H-UCL31.32
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL30.3
95% Adjusted-CLT UCL (Chen-1995)	98.93	97.5% Chebyshev (MVUE) UCL38.23
95% Modified-t UCL (Johnson-1978)	78.81	99% Chebyshev (MVUE) UCL53.79
Gamma Distribution Test		
Data Distribution		
k star (bias corrected)	0.304	Data do not follow a Discernable Distribution (0.05)
Theta Star	110.8	
MLE of Mean	33.65	
MLE of Standard Deviation	61.06	
nu star	20.66	
Approximate Chi Square Value (.05)	11.34	Nonparametric Statistics
Adjusted Level of Significance	0.0422	95% CLT UCL73.72
Adjusted Chi Square Value	10.99	95% Jackknife UCL74.87
		95% Standard Bootstrap UCL73.64
Anderson-Darling Test Statistic	5.919	95% Bootstrap-t UCL372.1
Anderson-Darling 5% Critical Value	0.853	95% Hall's Bootstrap UCL278.4
Kolmogorov-Smirnov Test Statistic	0.315	95% Percentile Bootstrap UCL81.11
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL118.8
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL139.8
		97.5% Chebyshev(Mean, Sd) UCL185.8
		99% Chebyshev(Mean, Sd) UCL276
Assuming Gamma Distribution		
95% Approximate Gamma UCL	61.32	
95% Adjusted Gamma UCL	63.22	
Potential UCL to Use	Use 95% Chebyshev (Mean, Sd) UCL139.8	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Barium

Number of Valid Observations	34	Number of Distinct Observations	34
Raw Statistics		Log-transformed Statistics	
Minimum	70.6	Minimum of Log Data	4.257
Maximum	2650	Maximum of Log Data	7.882
Mean	615.4	Mean of log Data	5.966
Median	418.5	SD of log Data	0.977
SD	651.5		
Coefficient of Variation	1.059		
Skewness	2.015		
Relevant UCL Statistics		Lognormal Distribution Test	
Normal Distribution Test		0.743 Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Critical Value	0.933
Shapiro Wilk Critical Value		Data appear Lognormal at 5% Significance Level	
Data not Normal at 5% Significance Level			
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% Student's-t UCL	804.5	95% H-UCL	948.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1134
95% Adjusted-CLT UCL (Chen-1995)	840.4	97.5% Chebyshev (MVUE) UCL	1358
95% Modified-t UCL (Johnson-1978)	810.9	99% Chebyshev (MVUE) UCL	1798
Gamma Distribution Test		Data Distribution	
k star (bias corrected)	1.146	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	537.2		
MLE of Mean	615.4		
MLE of Standard Deviation	575		
nu star	77.9		
Approximate Chi Square Value (.05)	58.57	Nonparametric Statistics	
Adjusted Level of Significance	0.0422	95% CLT UCL	799.2
Adjusted Chi Square Value	57.74	95% Jackknife UCL	804.5
		95% Standard Bootstrap UCL	796.6
Anderson-Darling Test Statistic	0.652	95% Bootstrap-t UCL	893.9
Anderson-Darling 5% Critical Value	0.771	95% Hall's Bootstrap UCL	889.7
Kolmogorov-Smirnov Test Statistic	0.139	95% Percentile Bootstrap UCL	808.3
Kolmogorov-Smirnov 5% Critical Value	0.155	95% BCA Bootstrap UCL	832.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1102
		97.5% Chebyshev(Mean, Sd) UCL	1313
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1727
95% Approximate Gamma UCL	818.5		
95% Adjusted Gamma UCL	830.3		
Potential UCL to Use		Use 95% Approximate Gamma UCL	818.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Cadmium

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	5
Number of Distinct Detected Data	4 Number of Non-Detect Data	29
	Percent Non-Detects	85.29%
Raw Statistics		
Log-transformed Statistics		
Minimum Detected	1 Minimum Detected	0
Maximum Detected	16.8 Maximum Detected	2.821
Mean of Detected	4.24 Mean of Detected	0.639
SD of Detected	7.022 SD of Detected	1.222
Minimum Non-Detect	1 Minimum Non-Detect	0
Maximum Non-Detect	1 Maximum Non-Detect	0

Warning: There are only 4 Distinct Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics		
Normal Distribution Test with Detected Values Only		
Lognormal Distribution Test with Detected Values Only		
Shapiro Wilk Test Statistic	0.562 Shapiro Wilk Test Statistic	0.602
5% Shapiro Wilk Critical Value	0.762 5% Shapiro Wilk Critical Value	0.762
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
Assuming Lognormal Distribution		
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	1.05 Mean	-0.497
SD	2.79 SD	0.64
95% DL/2 (t) UCL	1.86 95% H-Stat (DL/2) UCL	0.939
Maximum Likelihood Estimate(MLE) Method	N/A	
MLE yields a negative mean	Log ROS Method	
	Mean in Log Scale	-4.23
	SD in Log Scale	3.069
	Mean in Original Scale	0.658
	SD in Original Scale	2.874
	95% t UCL	1.492
	95% Percentile Bootstrap UCL	1.638
	95% BCA Bootstrap UCL	2.187
	95% H-UCL	32.08
Gamma Distribution Test with Detected Values Only		
Data Distribution Test with Detected Values Only		
k star (bias corrected)	0.431 Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.841	
nu star	4.309	
A-D Test Statistic	1.238 Nonparametric Statistics	
5% A-D Critical Value	0.699 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.699 Mean	1.476
5% K-S Critical Value	0.367 SD	2.668
Data not Gamma Distributed at 5% Significance Level	SE of Mean	0.512
	95% KM (t) UCL	2.342
	95% KM (z) UCL	2.318
	95% KM (jackknife) UCL	2.195
	95% KM (bootstrap t) UCL	45.46
	95% KM (BCA) UCL	2.953
	95% KM (Percentile Bootstrap) UCL	2.415
	95% KM (Chebyshev) UCL	3.706
	97.5% KM (Chebyshev) UCL	4.671
	99% KM (Chebyshev) UCL	6.566
	7.093	
	5.978 Potential UCLs to Use	
	95% KM (BCA) UCL	2.953
	1.629	
	95% Gamma Approximate UCL	2.289
	95% Adjusted Gamma UCL	2.453

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Chromium

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 21
Number of Distinct Detected Data	20	Number of Non-Detect Data 1300.00%
		Percent Non-Detects 38.24%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.34	Minimum Detected -1.079
Maximum Detected	96.8	Maximum Detected 4.573
Mean of Detected	10.3	Mean of Detected 0.821
SD of Detected	25.84	SD of Detected 1.497
Minimum Non-Detect	2	Minimum Non-Detect 0.693
Maximum Non-Detect	2	Maximum Non-Detect 0.693
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.403	Shapiro Wilk Test Statistic 0.872
5% Shapiro Wilk Critical Value	0.908	5% Shapiro Wilk Critical Value 0.908
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	6.747	Mean 0.507
SD	20.63	SD 1.234
95% DL/2 (t) UCL	12.74	95% H-Stat (DL/2) UCL 6.415
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale 0.319
		SD in Log Scale 1.432
		Mean in Original Scale 6.678
		SD in Original Scale 20.65
		95% t UCL 12.67
		95% Percentile Bootstrap UCL 13.14
		95% BCA Bootstrap UCL 16.06
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	0.401	Data Distribution Test with Detected Values Only
Theta Star	25.72	Data do not follow a Discernable Distribution (0.05)
nu star	16.82	
A-D Test Statistic		
5% A-D Critical Value	2.783	Nonparametric Statistics
K-S Test Statistic	0.819	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.819	Mean 6.666
Data not Gamma Distributed at 5% Significance Level	0.202	SD 20.35
		SE of Mean 3.577
		95% KM (t) UCL 12.72
		95% KM (z) UCL 12.55
		95% KM (jackknife) UCL 12.66
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 78.22
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 14.13
Minimum	1.00E-12	95% KM (Percentile Bootstrap) UCL 12.95
Maximum	96.8	2.5 95% KM (Chebyshev) UCL 22.26
Mean	1.12E+01	97.5% KM (Chebyshev) UCL 29.01
Median		99% KM (Chebyshev) UCL 42.26
SD		
k star	0.172	
Theta star	65.13	
Nu star	11.71	Potential UCLs to Use
AppChi2	5.038	97.5% KM (Chebyshev) UCL 29.01
95% Gamma Approximate UCL	26.08	
95% Adjusted Gamma UCL	27.24	
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Cobalt

General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 14
Number of Distinct Detected Data	13	Number of Non-Detect Data 20
		Percent Non-Detects 58.82%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	0.17	Minimum Detected -1.772
Maximum Detected	3.5	Maximum Detected 1.253
Mean of Detected	0.983	Mean of Detected -0.451
SD of Detected	1.059	SD of Detected 0.926
Minimum Non-Detect	1	Minimum Non-Detect 0
Maximum Non-Detect	1	Maximum Non-Detect 0
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.724	Shapiro Wilk Test Statistic 0.938
5% Shapiro Wilk Critical Value	0.874	5% Shapiro Wilk Critical Value 0.874
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	0.699	Mean -0.593
SD	0.707	SD 0.593
95% DL/2 (t) UCL	0.904	95% H-Stat (DL/2) UCL 0.812
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale -0.664
		SD in Log Scale 0.801
		Mean in Original Scale 0.725
		SD in Original Scale 0.747
		95% t UCL 0.942
		95% Percentile Bootstrap UCL 0.941
		95% BCA Bootstrap UCL 1.004
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	1.065	Data Distribution Test with Detected Values Only
Theta Star	0.922	Data appear Gamma Distributed at 5% Significance Level
nu star	29.83	
A-D Test Statistic		
	0.75	Nonparametric Statistics
5% A-D Critical Value	0.754	Kaplan-Meier (KM) Method
K-S Test Statistic	0.754	Mean 0.691
5% K-S Critical Value	0.234	SD 0.722
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.139
		95% KM (t) UCL 0.927
		95% KM (z) UCL 0.92
		95% KM (jackknife) UCL 0.925
Assuming Gamma Distribution		95% KM (bootstrap t) UCL 1.041
Gamma ROS Statistics using Extrapolated Data		95% KM (BCA) UCL 0.94
Minimum	0.17	95% KM (Percentile Bootstrap) UCL 0.934
Maximum	3.5	95% KM (Chebyshev) UCL 1.299
Mean	0.916	97.5% KM (Chebyshev) UCL 1.561
Median	0.725	99% KM (Chebyshev) UCL 2.078
SD	0.721	
k star	2.082	
Theta star	0.44	
Nu star	141.6	Potential UCLs to Use
AppChi2	115.1	95% KM (t) UCL 0.927
95% Gamma Approximate UCL	1.127	
95% Adjusted Gamma UCL	1.139	
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Iron

General Statistics (µg/L)		
Number of Valid Data	34 Number of Detected Data	31
Number of Distinct Detected Data	31 Number of Non-Detect Data	3
	Percent Non-Detects	8.82%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	46.6 Minimum Detected	3.842
Maximum Detected	8520 Maximum Detected	9.05
Mean of Detected	1306 Mean of Detected	6.205
SD of Detected	2116 SD of Detected	1.452
Minimum Non-Detect	100 Minimum Non-Detect	4.605
Maximum Non-Detect	100 Maximum Non-Detect	4.605
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.598 Shapiro Wilk Test Statistic	0.962
5% Shapiro Wilk Critical Value	0.929 5% Shapiro Wilk Critical Value	0.929
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	1195 Mean	6.003
SD	2050 SD	1.534
95% DL/2 (t) UCL	1790 95% H-Stat (DL/2) UCL	3058
Maximum Likelihood Estimate(MLE) Method		
	Log ROS Method	
Mean	734 Mean in Log Scale	6.025
SD	2495 SD in Log Scale	1.51
95% MLE (t) UCL	1458 Mean in Original Scale	1197
95% MLE (Tiku) UCL	1472 SD in Original Scale	2049
	95% t UCL	1791
	95% Percentile Bootstrap UCL	1780
	95% BCA Bootstrap UCL	2108
Gamma Distribution Test with Detected Values Only		
	Data Distribution Test with Detected Values Only	
k star (bias corrected)	0.593 Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	2202	
nu star	36.77	
A-D Test Statistic		
	0.87 Nonparametric Statistics	
5% A-D Critical Value	0.798 Kaplan-Meier (KM) Method	
K-S Test Statistic	0.798 Mean	1197
5% K-S Critical Value	0.165 SD	2019
Data follow Appr. Gamma Distribution at 5% Significance Level	SE of Mean	351.9
	95% KM (t) UCL	1792
	95% KM (z) UCL	1775
	95% KM (jackknife) UCL	1791
Assuming Gamma Distribution	1.00E-12 95% KM (bootstrap t) UCL	2286
Gamma ROS Statistics using Extrapolated Data	8520 95% KM (BCA) UCL	1819
Minimum	1190 95% KM (Percentile Bootstrap) UCL	1776
Maximum	482 95% KM (Chebyshev) UCL	2731
Mean	2053 97.5% KM (Chebyshev) UCL	3394
Median	0.194 99% KM (Chebyshev) UCL	4698
SD	6121	
k star	13.22 Potential UCLs to Use	
Theta star	6.044 95% KM (Chebyshev) UCL	2731
Nu star	2605	
AppChi2	2712	
95% Gamma Approximate UCL		
95% Adjusted Gamma UCL		
Note: DL/2 is not a recommended method.		

Note: DL/2 is not a recommended method.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

SHALLOW ONSITE GROUNDWATER

Manganese

General Statistics (µg/L)		
Number of Valid Observations	34	Number of Distinct Observations34
Raw Statistics	Log-transformed Statistics	
Minimum	23.4	Minimum of Log Data3.153
Maximum	1660	Maximum of Log Data7.415
Mean	466.6	Mean of log Data5.425
Median	194	SD of log Data1.305
SD	506.3	
Coefficient of Variation	1.085	
Skewness	1.025	
Relevant UCL Statistics		
Normal Distribution Test	Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.799	Shapiro Wilk Test Statistic0.922
Shapiro Wilk Critical Value	0.933	Shapiro Wilk Critical Value0.933
Data not Normal at 5% Significance Level	Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution	Assuming Lognormal Distribution	
95% Student's-t UCL	613.6	95% H-UCL1016
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL1123
95% Adjusted-CLT UCL (Chen-1995)	625.8	97.5% Chebyshev (MVUE) UCL1389
95% Modified-t UCL (Johnson-1978)	616.1	99% Chebyshev (MVUE) UCL1910
Gamma Distribution Test	Data Distribution	
k star (bias corrected)	0.768	Data Follow Appr. Gamma Distribution at 5% Significance Level
Theta Star	607.4	
MLE of Mean	466.6	
MLE of Standard Deviation	532.4	
nu star	52.24	
Approximate Chi Square Value (.05)	36.64	Nonparametric Statistics
Adjusted Level of Significance	0.0422	95% CLT UCL609.5
Adjusted Chi Square Value	35.99	95% Jackknife UCL613.6
		95% Standard Bootstrap UCL606.7
Anderson-Darling Test Statistic	1.194	95% Bootstrap-t UCL630.2
Anderson-Darling 5% Critical Value	0.784	95% Hall's Bootstrap UCL622.5
Kolmogorov-Smirnov Test Statistic	0.143	95% Percentile Bootstrap UCL606
Kolmogorov-Smirnov 5% Critical Value	0.156	95% BCA Bootstrap UCL626.5
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL845.1
		97.5% Chebyshev(Mean, Sd) UCL1009
		99% Chebyshev(Mean, Sd) UCL1331
Assuming Gamma Distribution		
95% Approximate Gamma UCL	665.3	
95% Adjusted Gamma UCL	677.3	
Potential UCL to Use	Use 95% Approximate Gamma UCL665.3	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

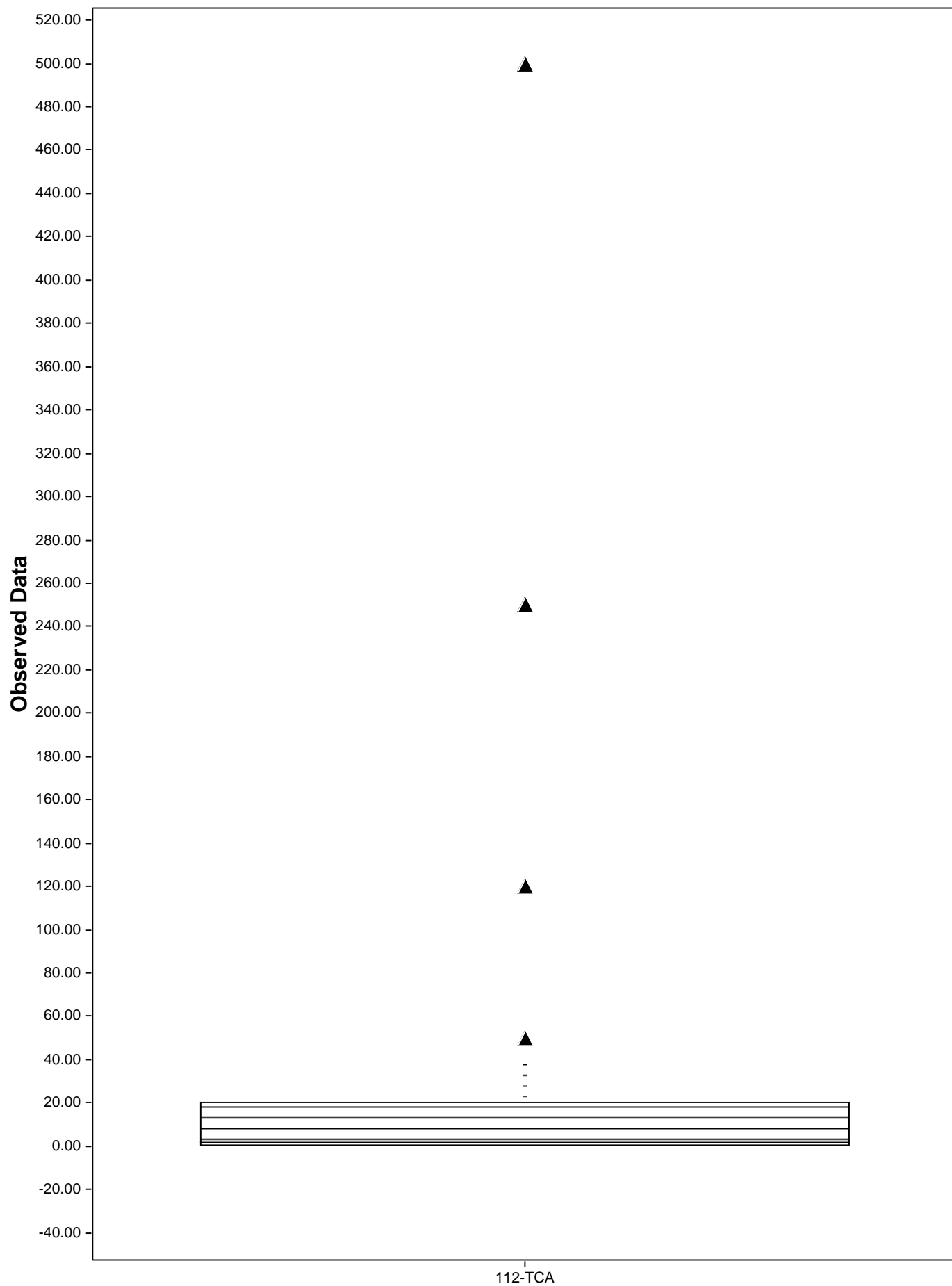
SHALLOW ONSITE GROUNDWATER

Vanadium

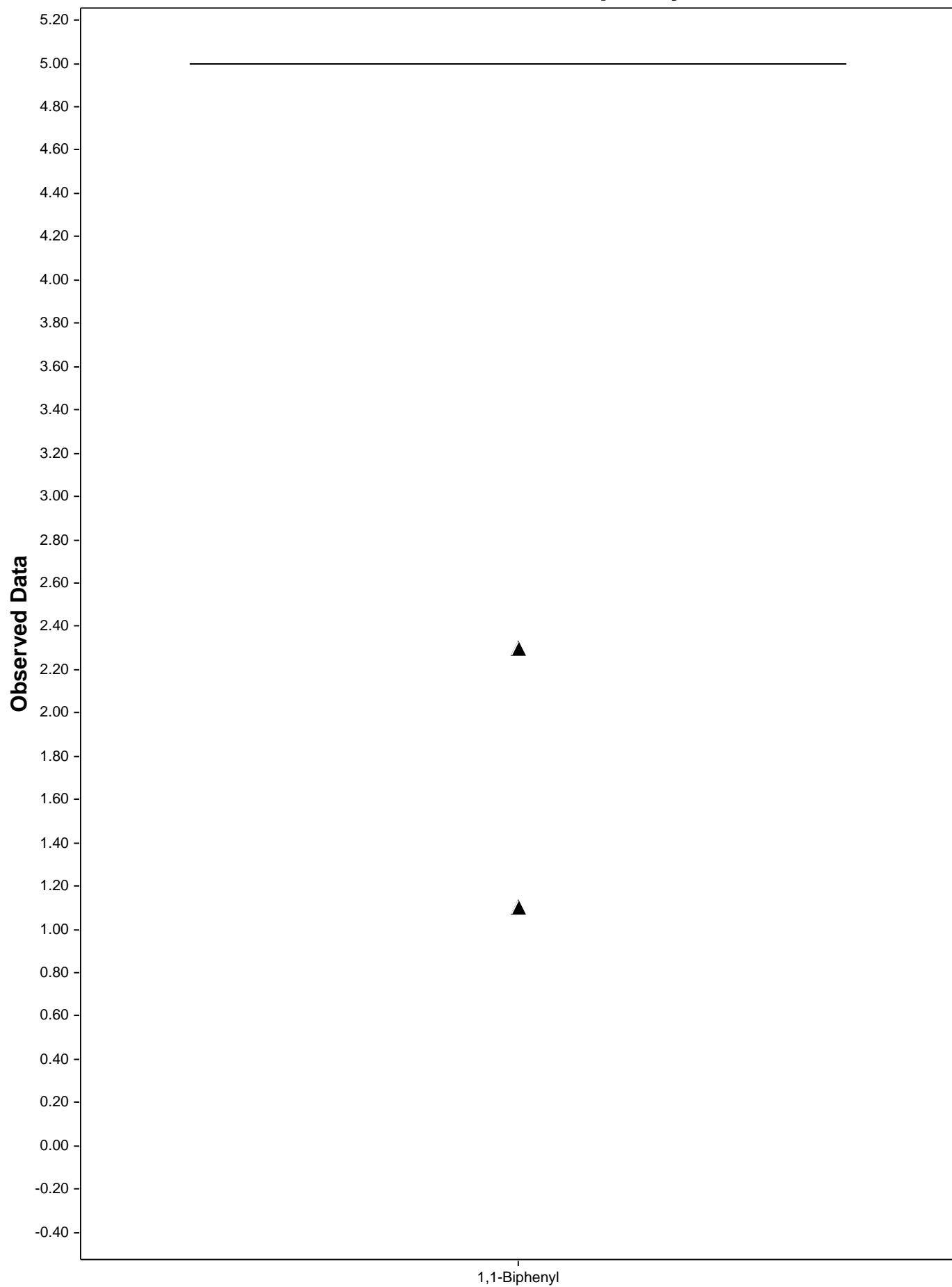
General Statistics (µg/L)		
Number of Valid Data	34	Number of Detected Data 21
Number of Distinct Detected Data	20	Number of Non-Detect Data 13
		Percent Non-Detects 38.24%
Raw Statistics		
	Log-transformed Statistics	
Minimum Detected	1.3	Minimum Detected 0.262
Maximum Detected	30.1	Maximum Detected 3.405
Mean of Detected	7.702	Mean of Detected 1.686
SD of Detected	7.053	SD of Detected 0.874
Minimum Non-Detect	5	Minimum Non-Detect 1.609
Maximum Non-Detect	5	Maximum Non-Detect 1.609
UCL Statistics		
Normal Distribution Test with Detected Values Only	Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic 0.969
5% Shapiro Wilk Critical Value	0.908	5% Shapiro Wilk Critical Value 0.908
Data not Normal at 5% Significance Level	Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		
	Assuming Lognormal Distribution	
DL/2 Substitution Method	DL/2 Substitution Method	
Mean	5.713	Mean 1.392
SD	6.061	SD 0.779
95% DL/2 (t) UCL	7.472	95% H-Stat (DL/2) UCL 7.344
Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method
MLE yields a negative mean		Mean in Log Scale 1.427
		SD in Log Scale 0.829
		Mean in Original Scale 5.951
		SD in Original Scale 6.01
		95% t UCL 7.695
		95% Percentile Bootstrap UCL 7.764
		95% BCA Bootstrap UCL 8.281
Gamma Distribution Test with Detected Values Only		
k star (bias corrected)	Data Distribution Test with Detected Values Only	
Theta Star	1.362	Data appear Gamma Distributed at 5% Significance Level
nu star	5.655	
	57.21	
A-D Test Statistic		
5% A-D Critical Value	0.409	Nonparametric Statistics
K-S Test Statistic	0.758	Kaplan-Meier (KM) Method
5% K-S Critical Value	0.758	Mean 5.927
Data appear Gamma Distributed at 5% Significance Level	0.193	SD 5.91
		SE of Mean 1.057
		95% KM (t) UCL 7.716
		95% KM (z) UCL 7.665
		95% KM (jackknife) UCL 7.705
	1.3	95% KM (bootstrap t) UCL 8.45
	30.1	95% KM (BCA) UCL 7.985
	7.866	95% KM (Percentile Bootstrap) UCL 7.751
	6.677	95% KM (Chebyshev) UCL 10.53
	5.694	97.5% KM (Chebyshev) UCL 12.53
	2.069	99% KM (Chebyshev) UCL 16.44
	3.802	
	140.7	Potential UCLs to Use
	114.3	95% KM (Percentile Bootstrap) UCL 7.751
	9.684	
	9.785	
Note: DL/2 is not a recommended method.		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). For additional insight, the user may want to consult a statistician.

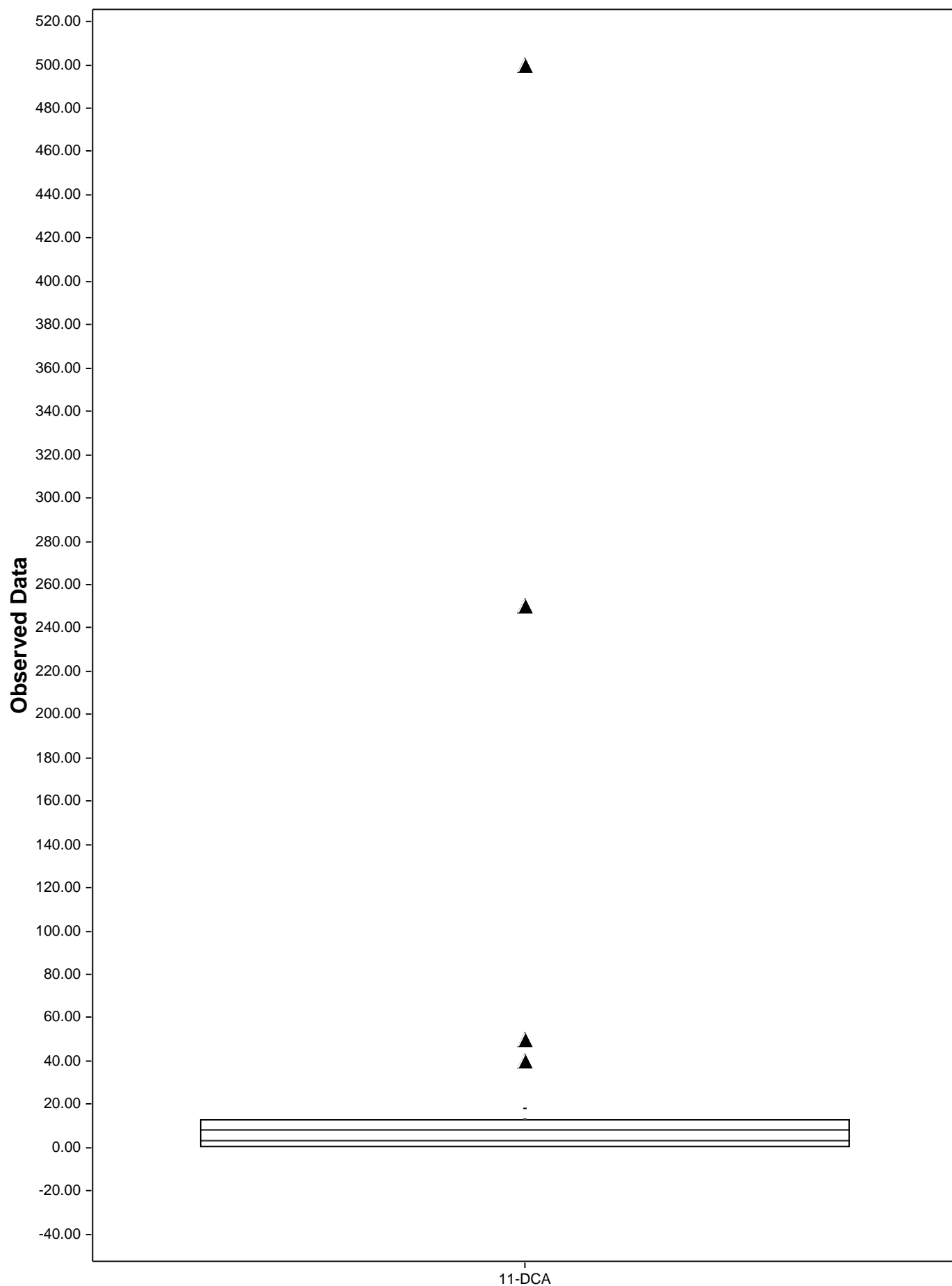
Box Plot for 112-TCA



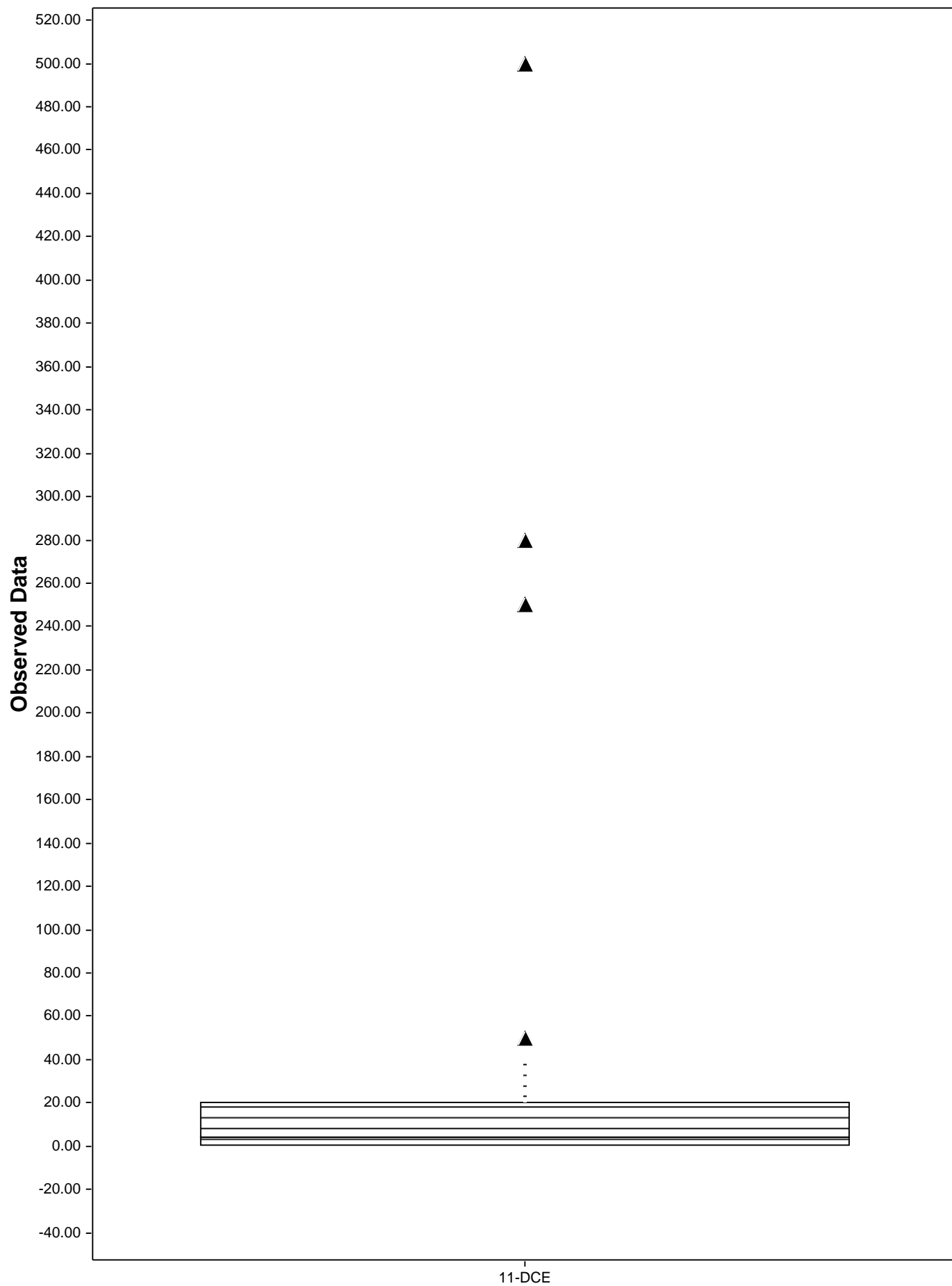
Box Plot for 1,1-Biphenyl



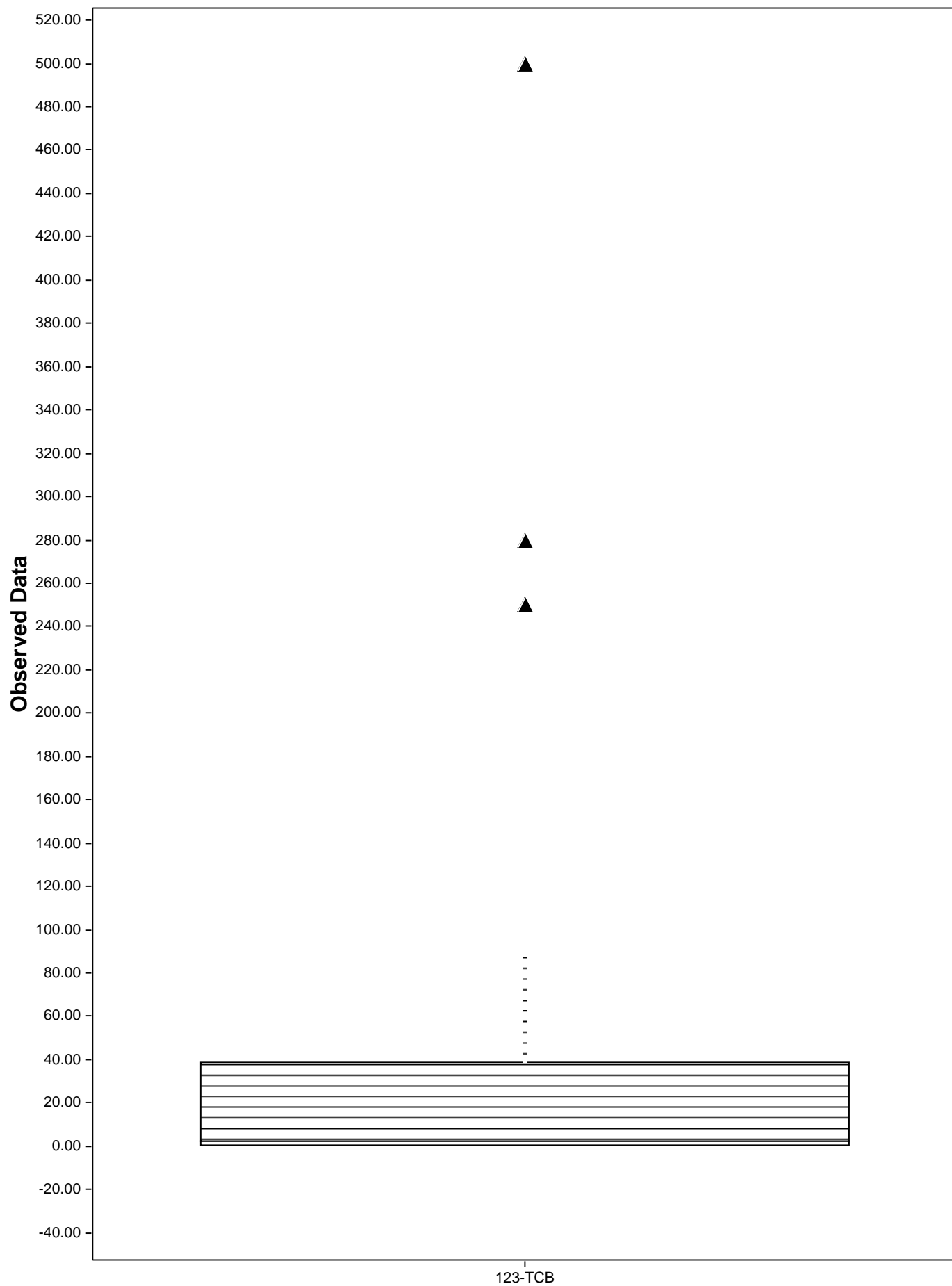
Box Plot for 11-DCA



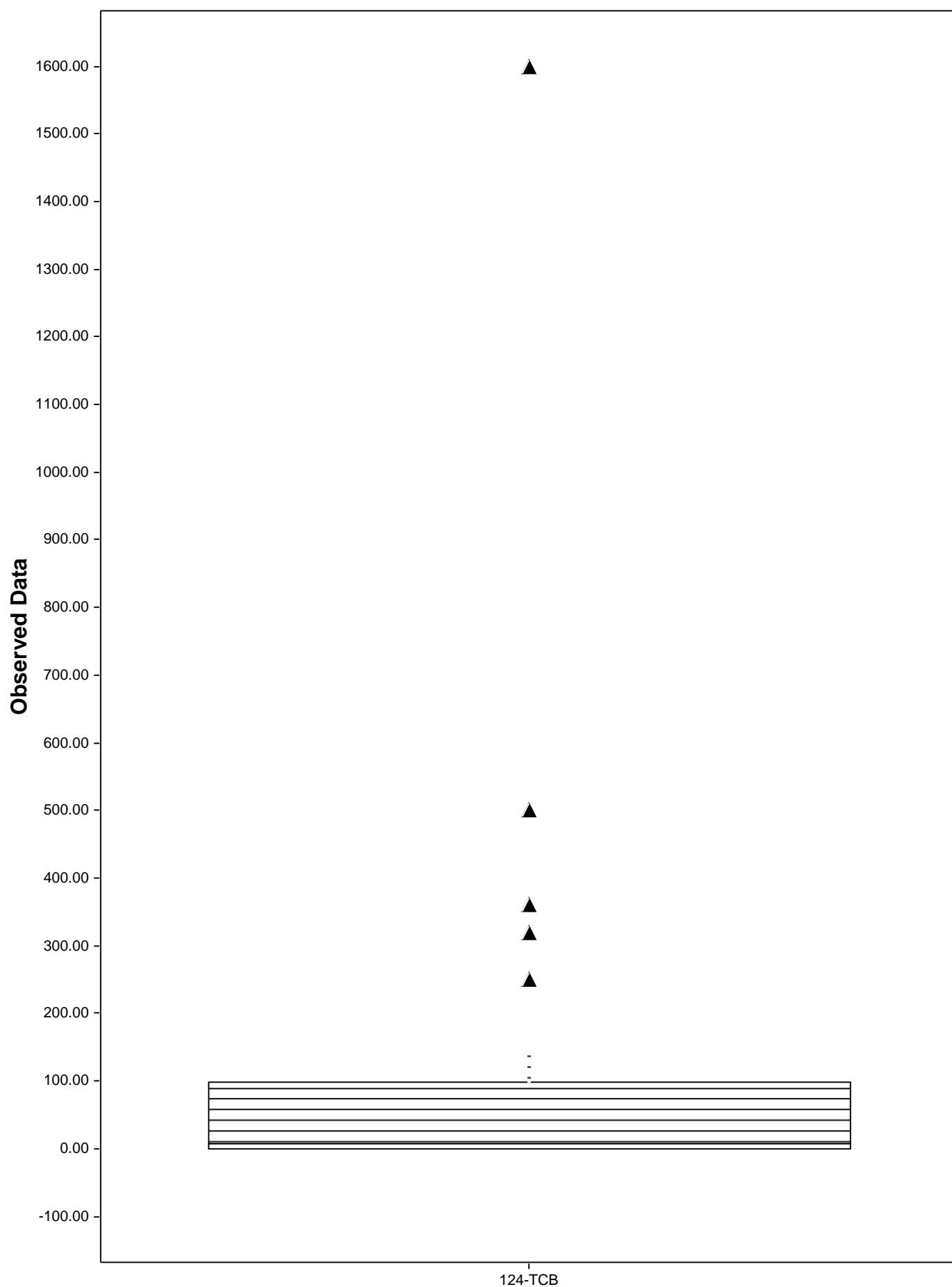
Box Plot for 11-DCE



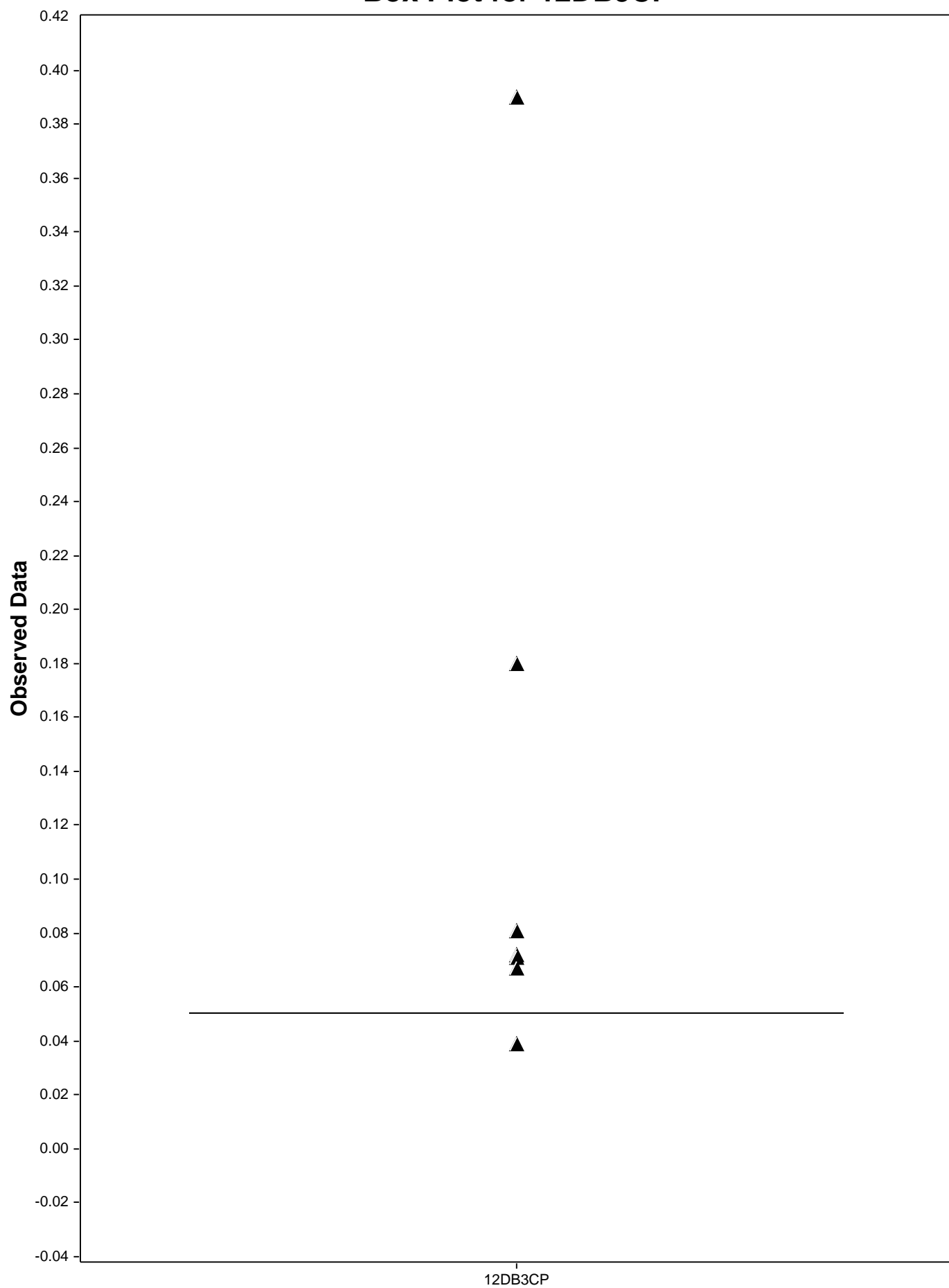
Box Plot for 123-TCB



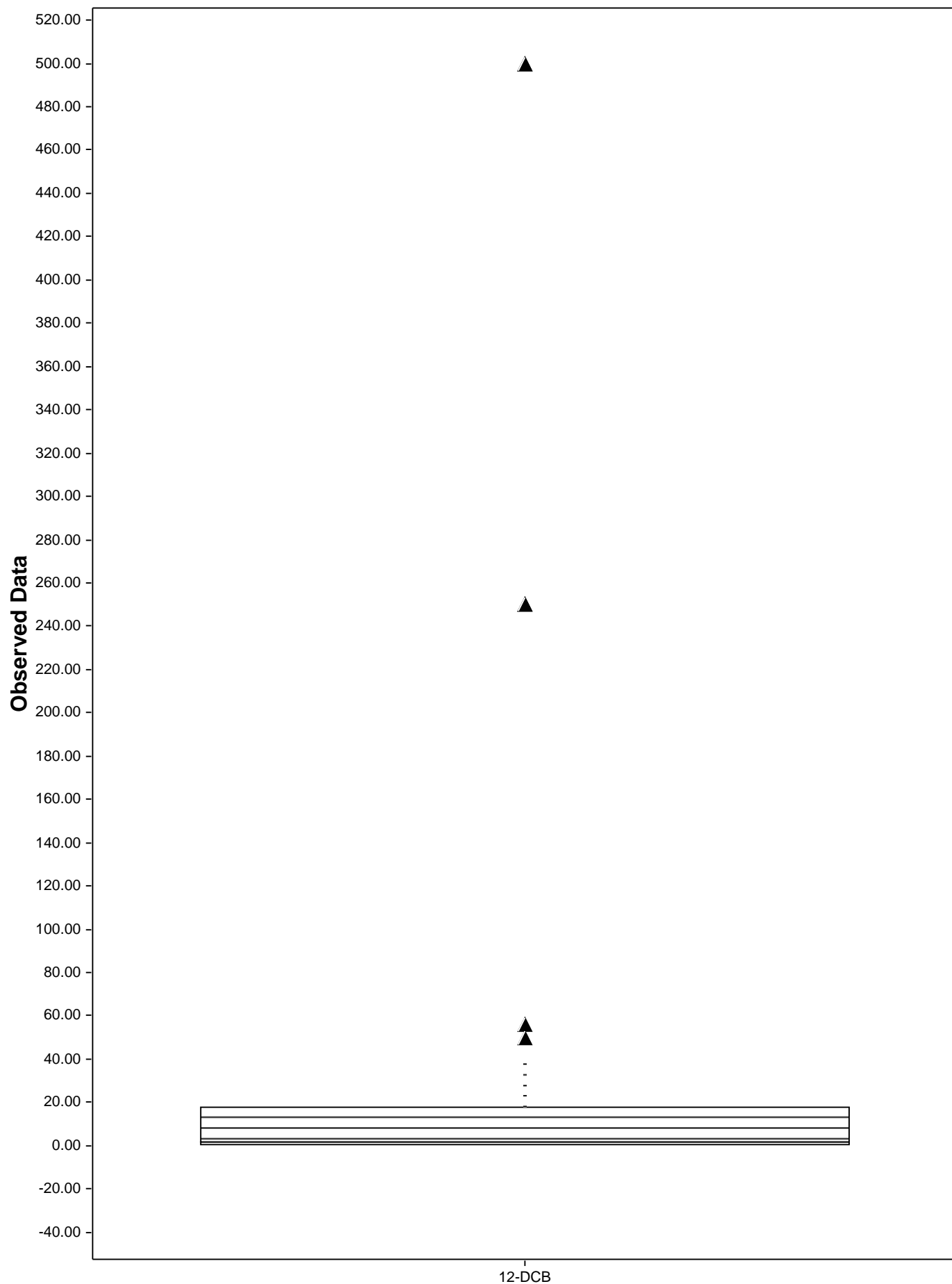
Box Plot for 124-TCB



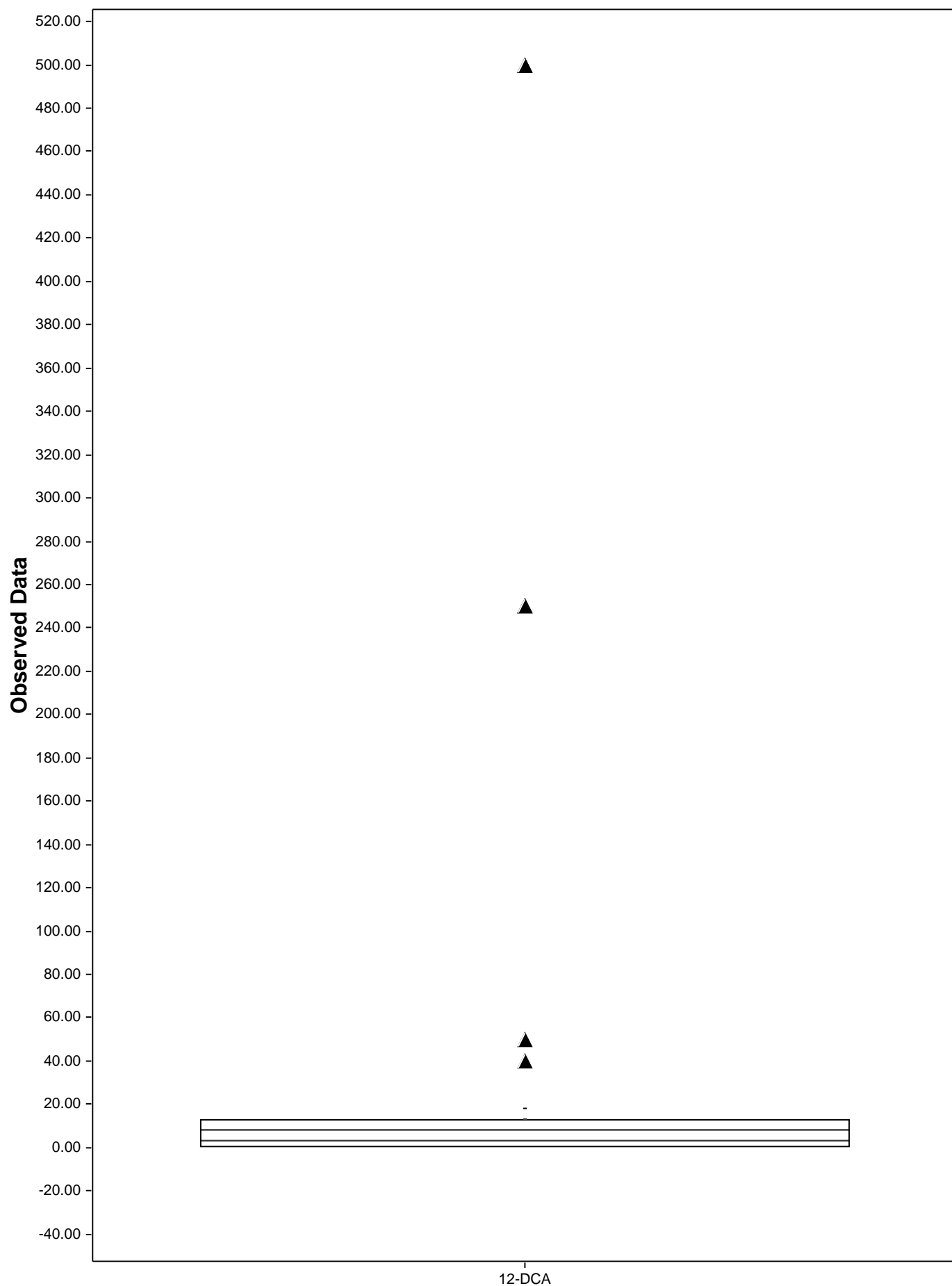
Box Plot for 12DB3CP



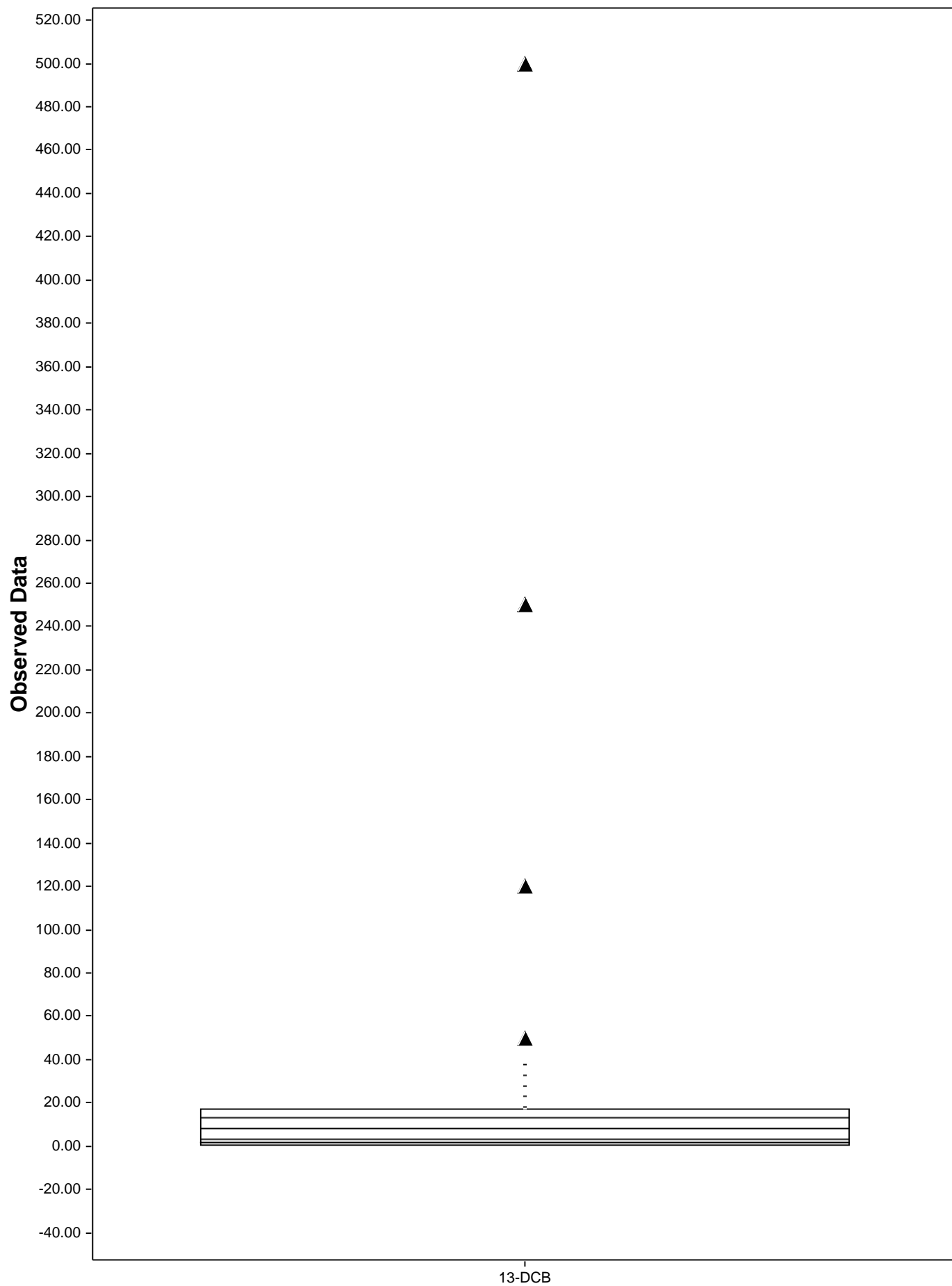
Box Plot for 12-DCB



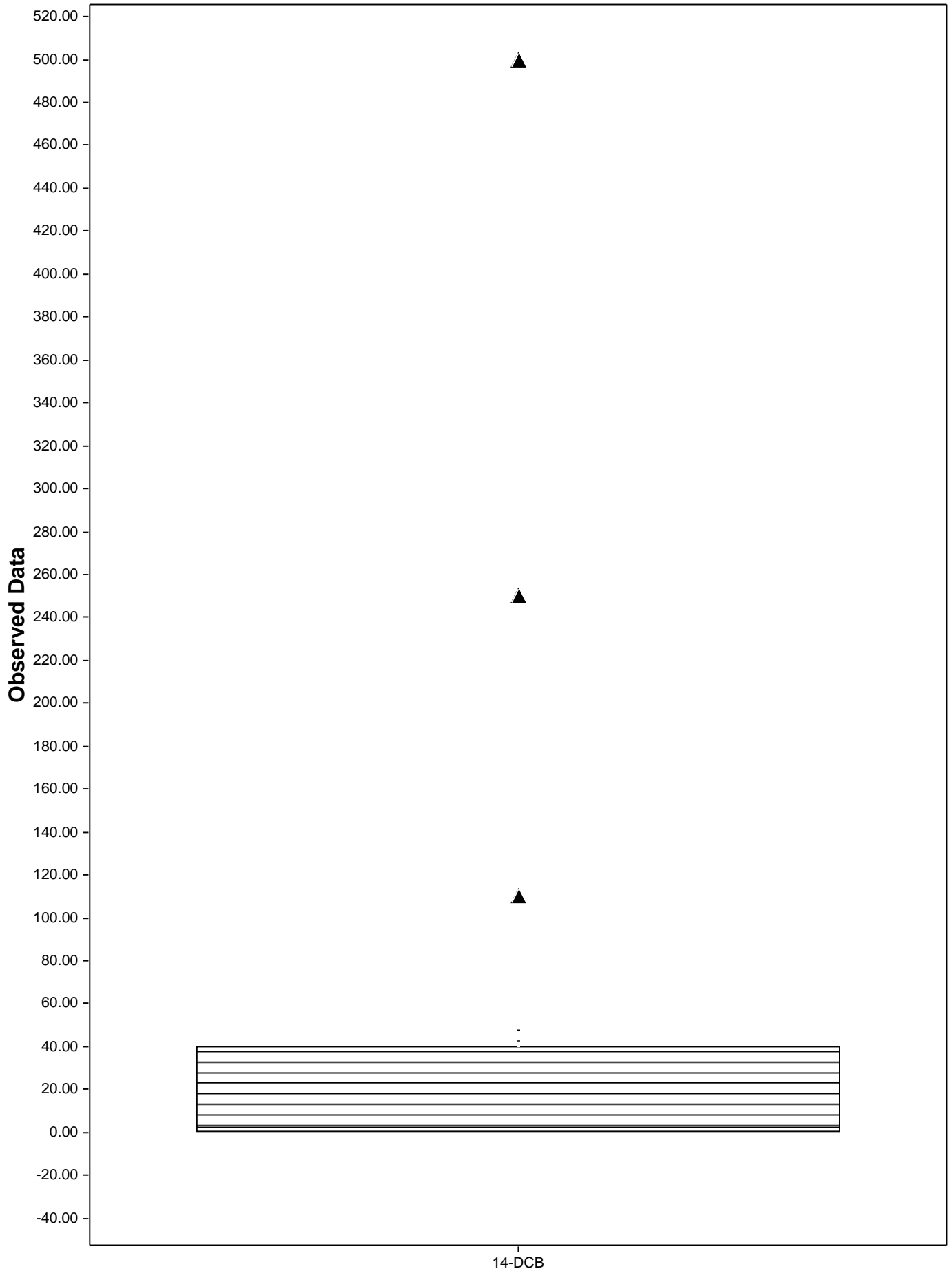
Box Plot for 12-DCA



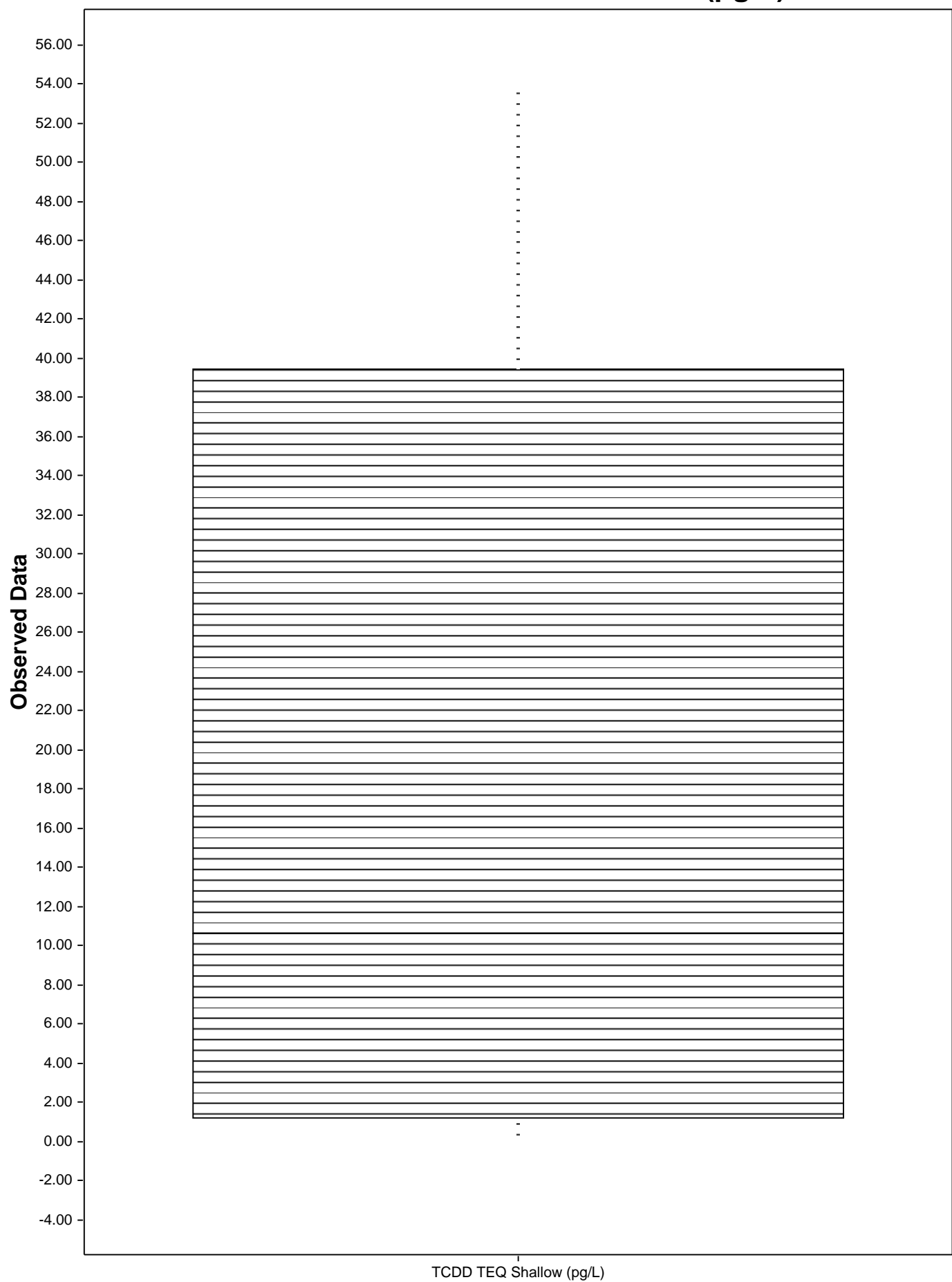
Box Plot for 13-DCB



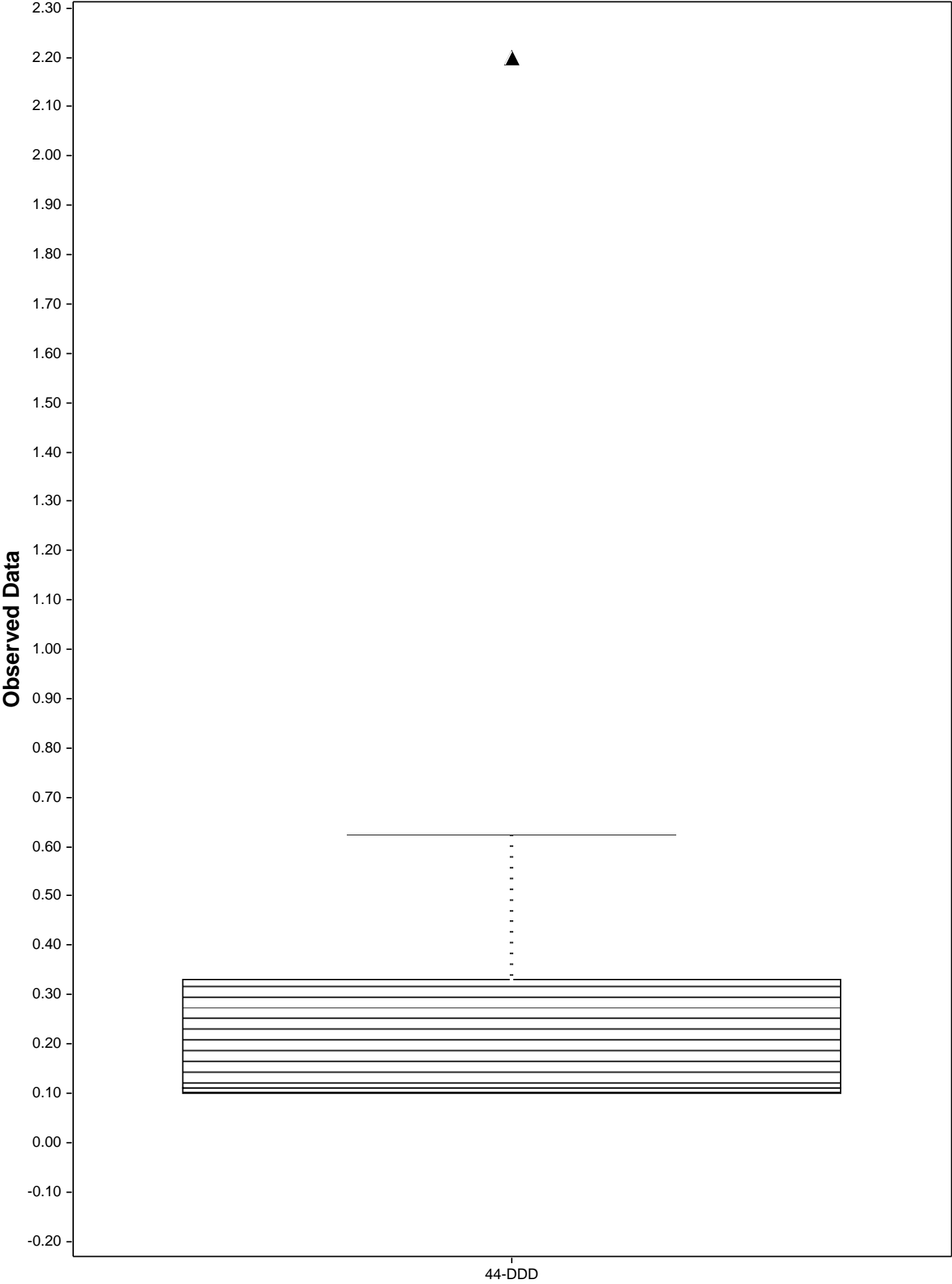
Box Plot for 14-DCB



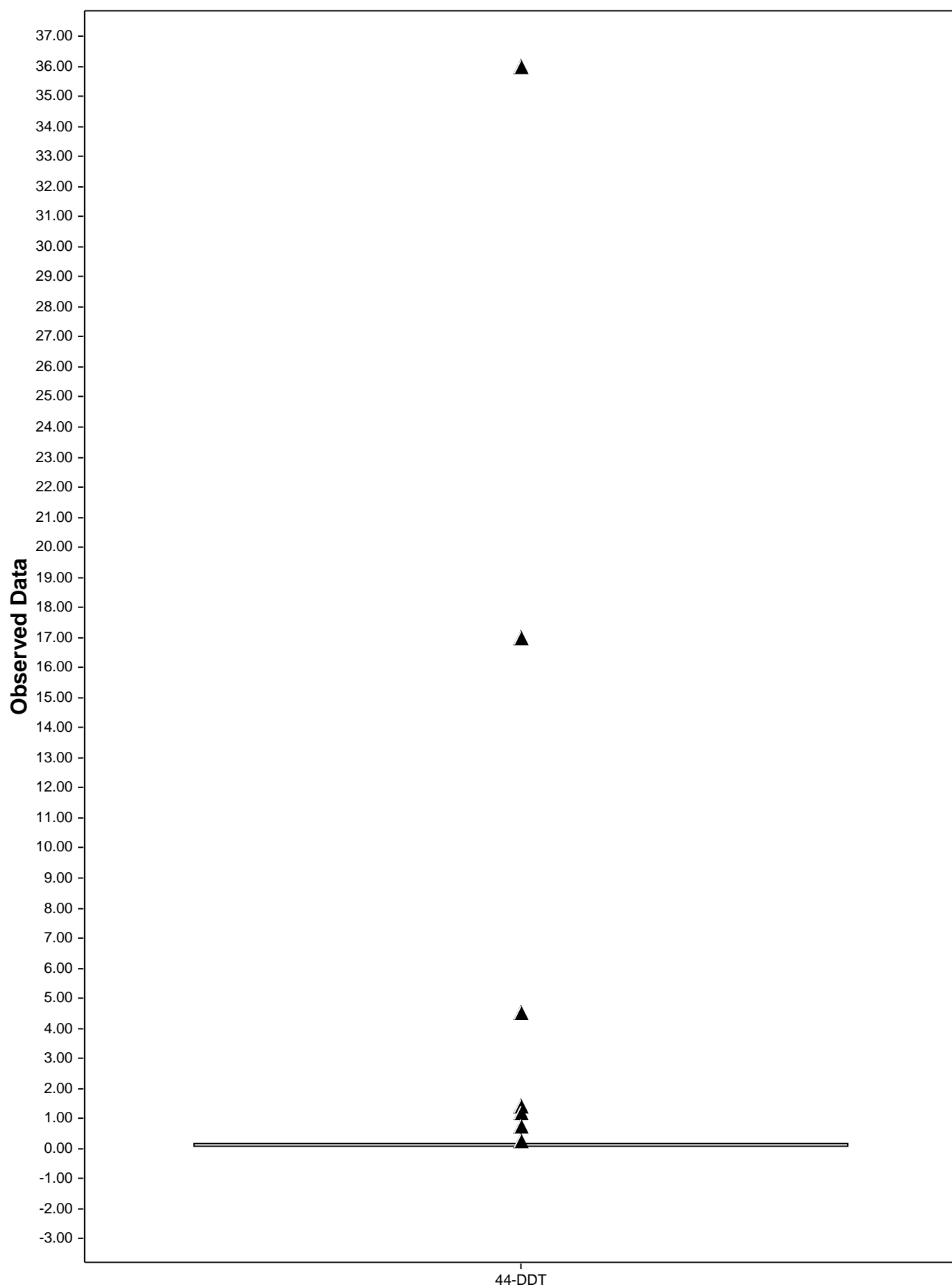
Box Plot for TCDD TEQ Shallow (pg/L)



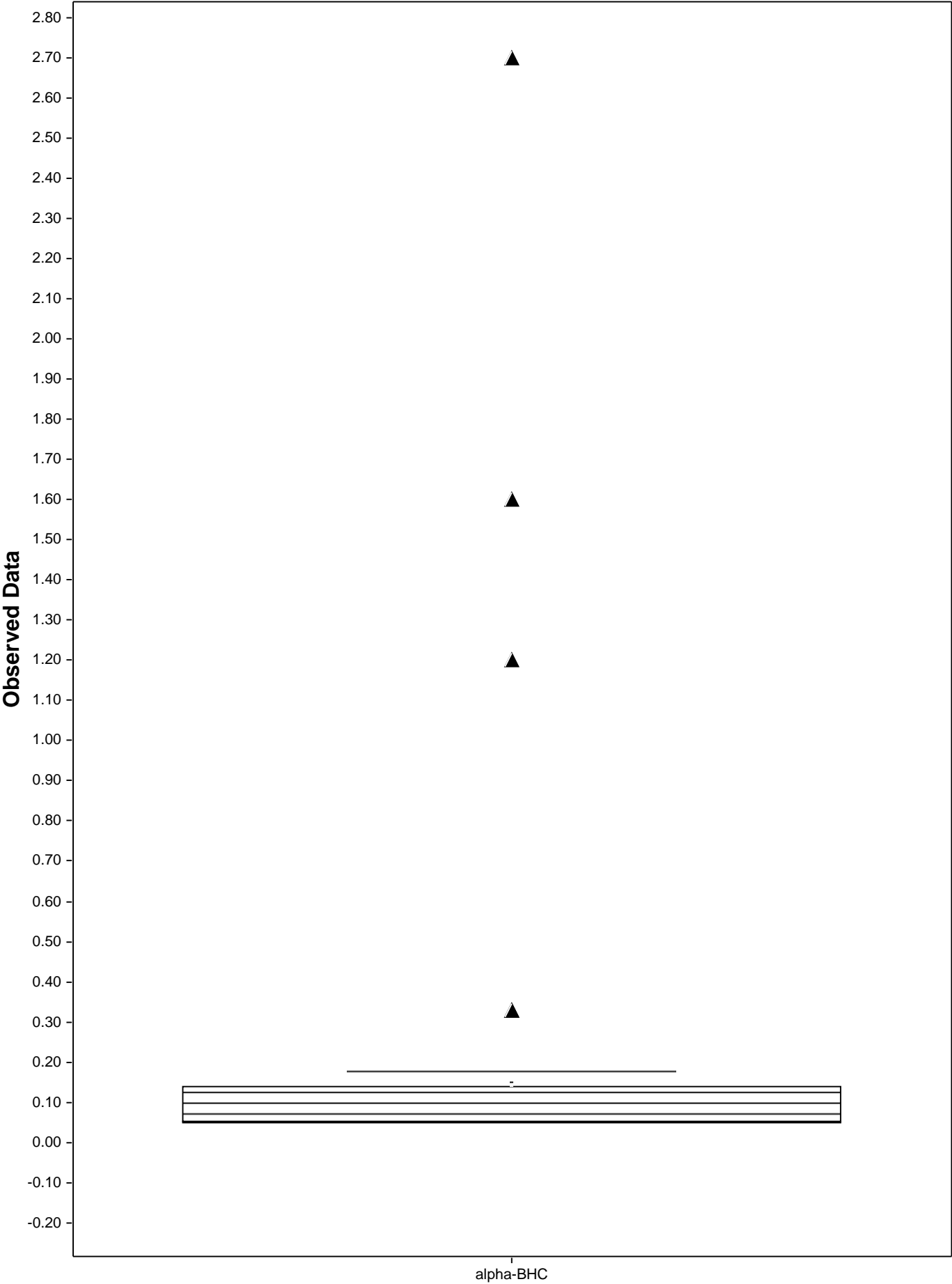
Box Plot for 44-DDD



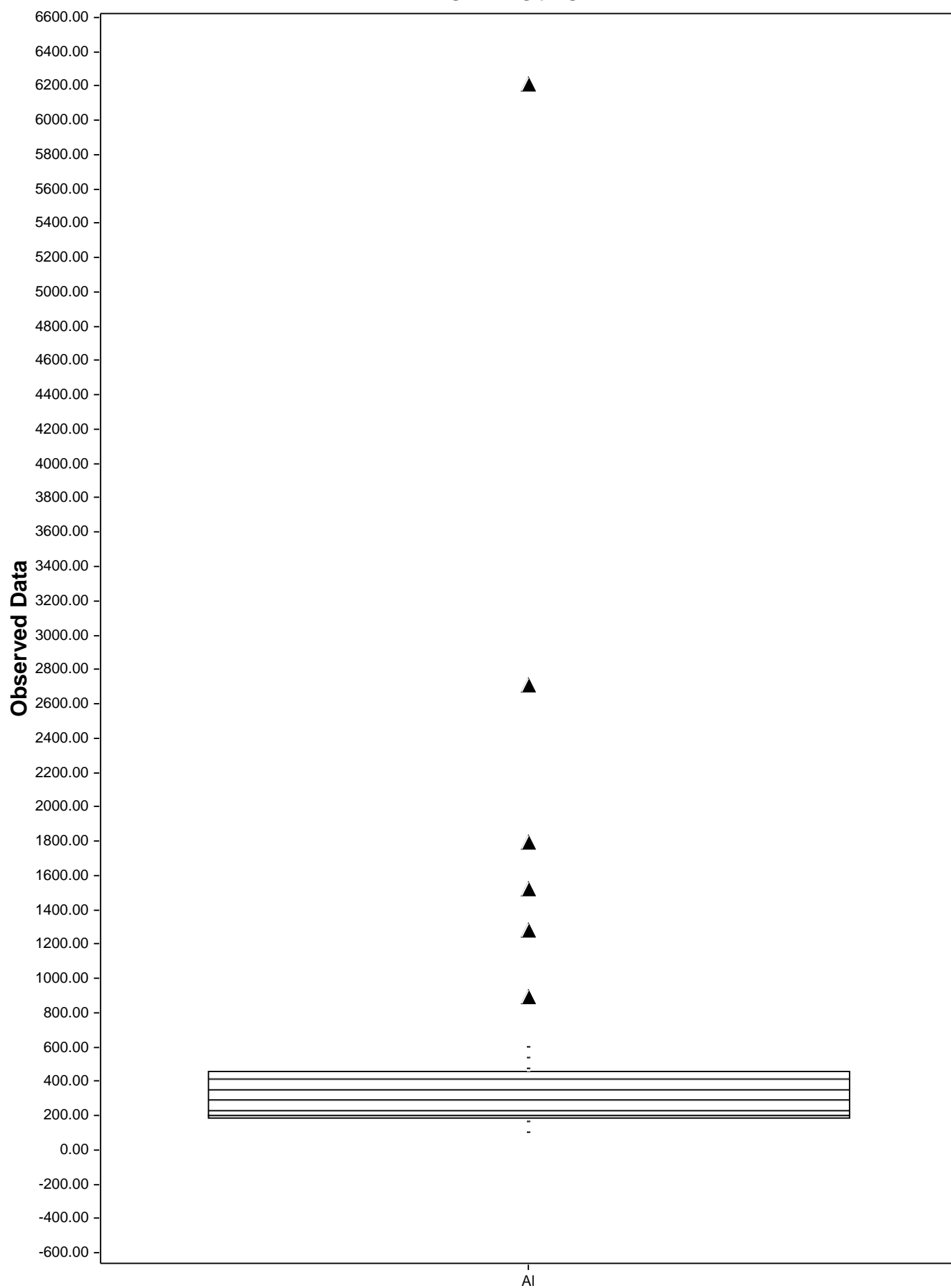
Box Plot for 44-DDT



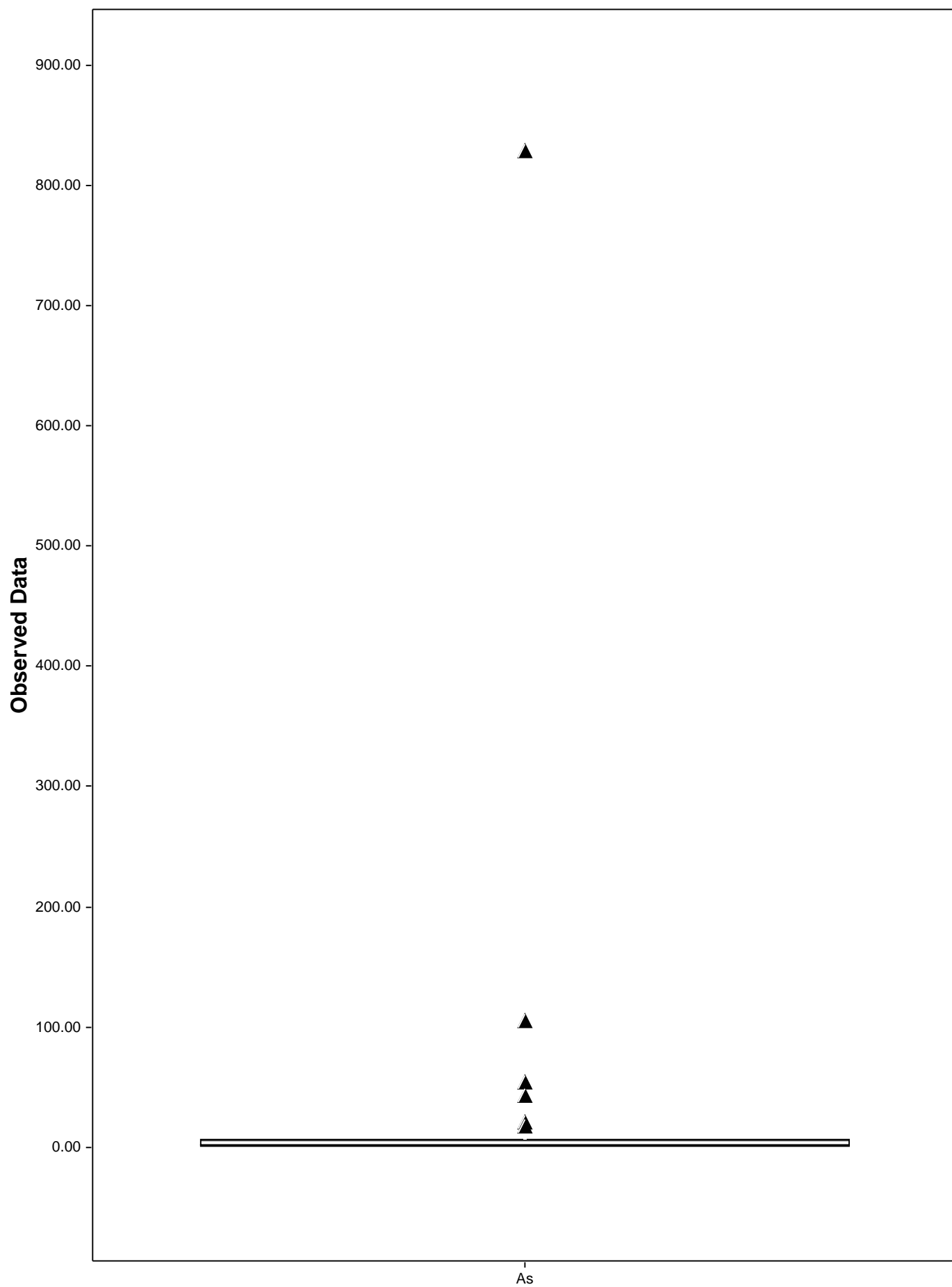
Box Plot for alpha-BHC



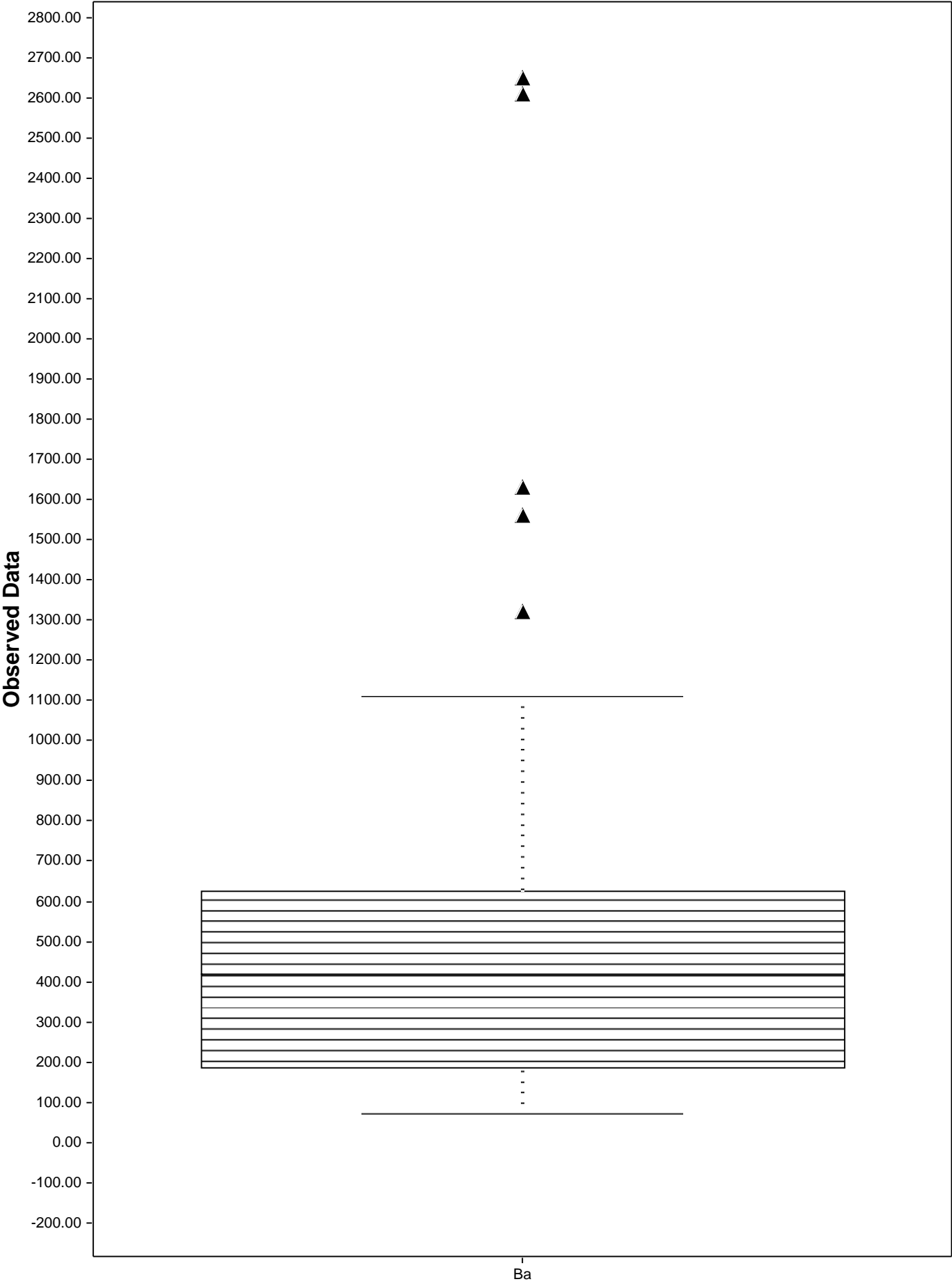
Box Plot for AI



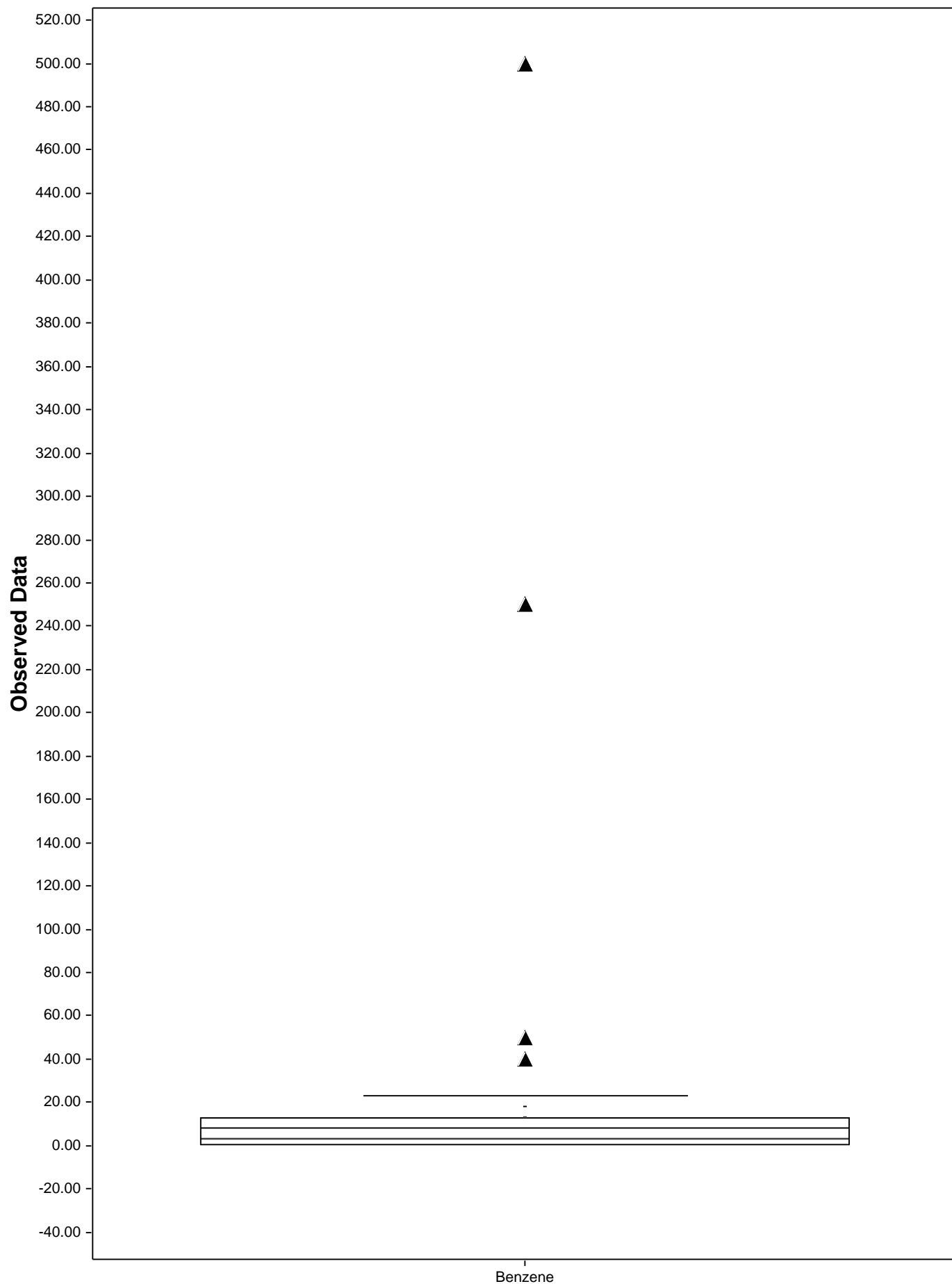
Box Plot for As



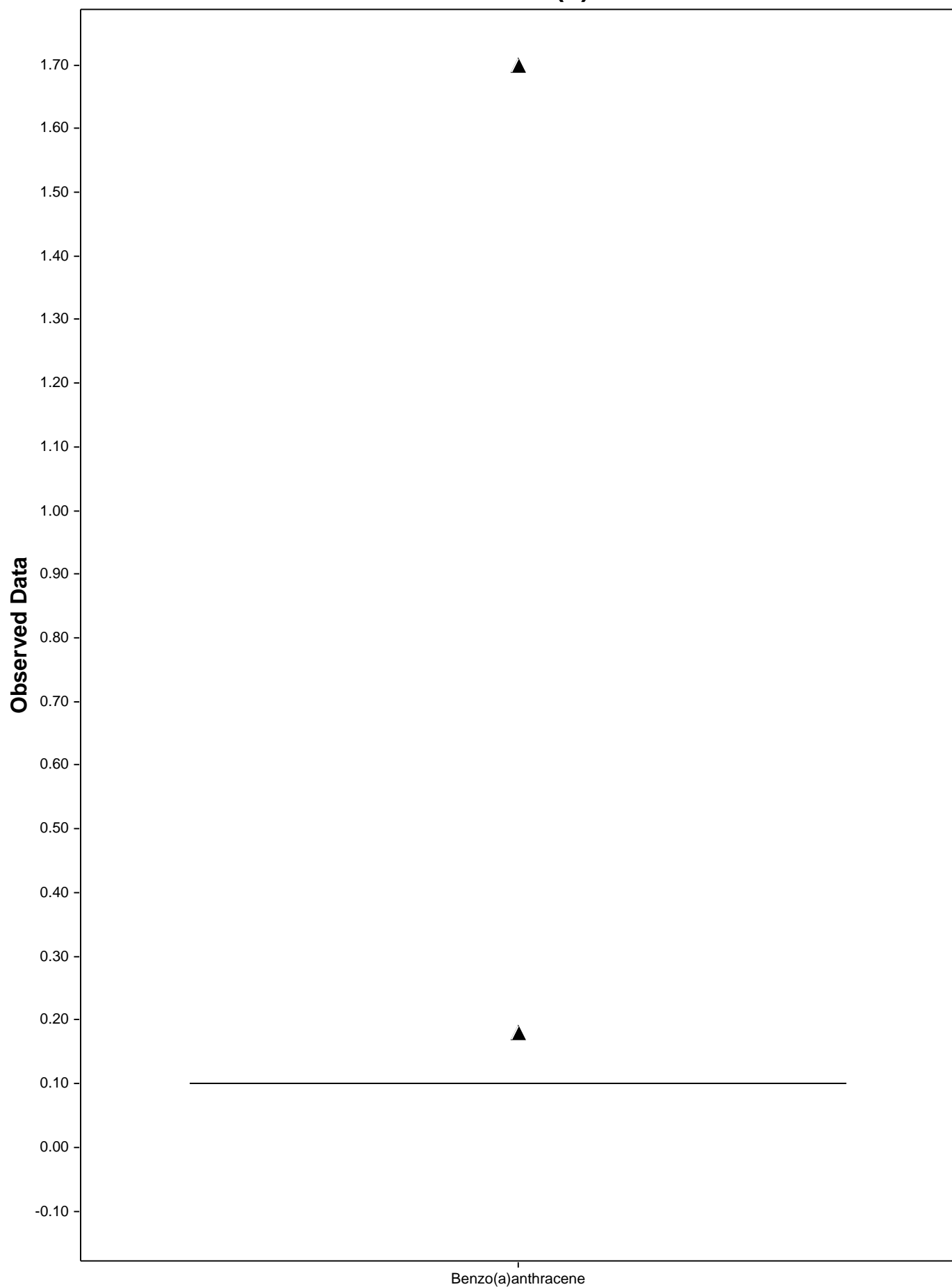
Box Plot for Ba



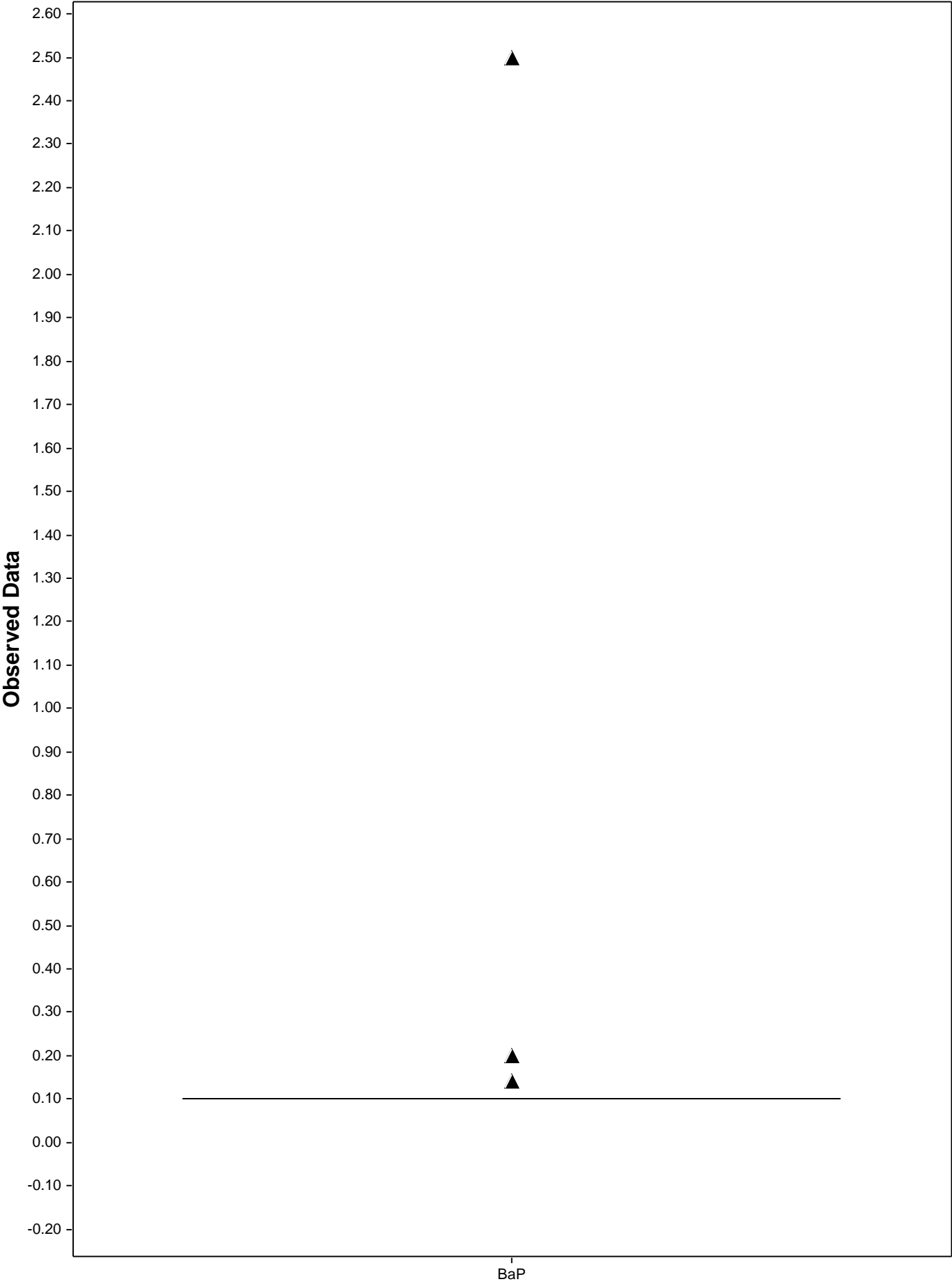
Box Plot for Benzene



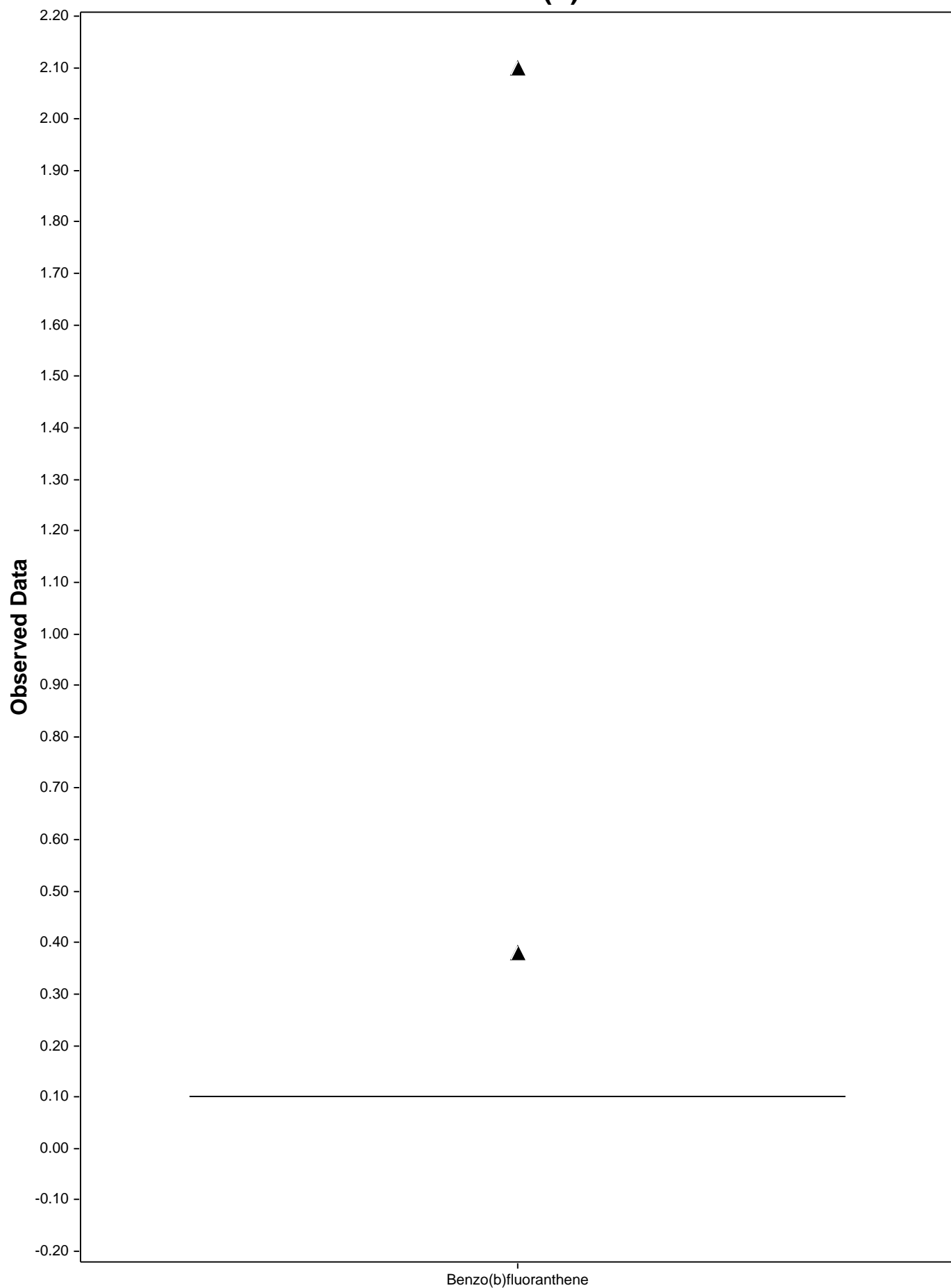
Box Plot for Benzo(a)anthracene



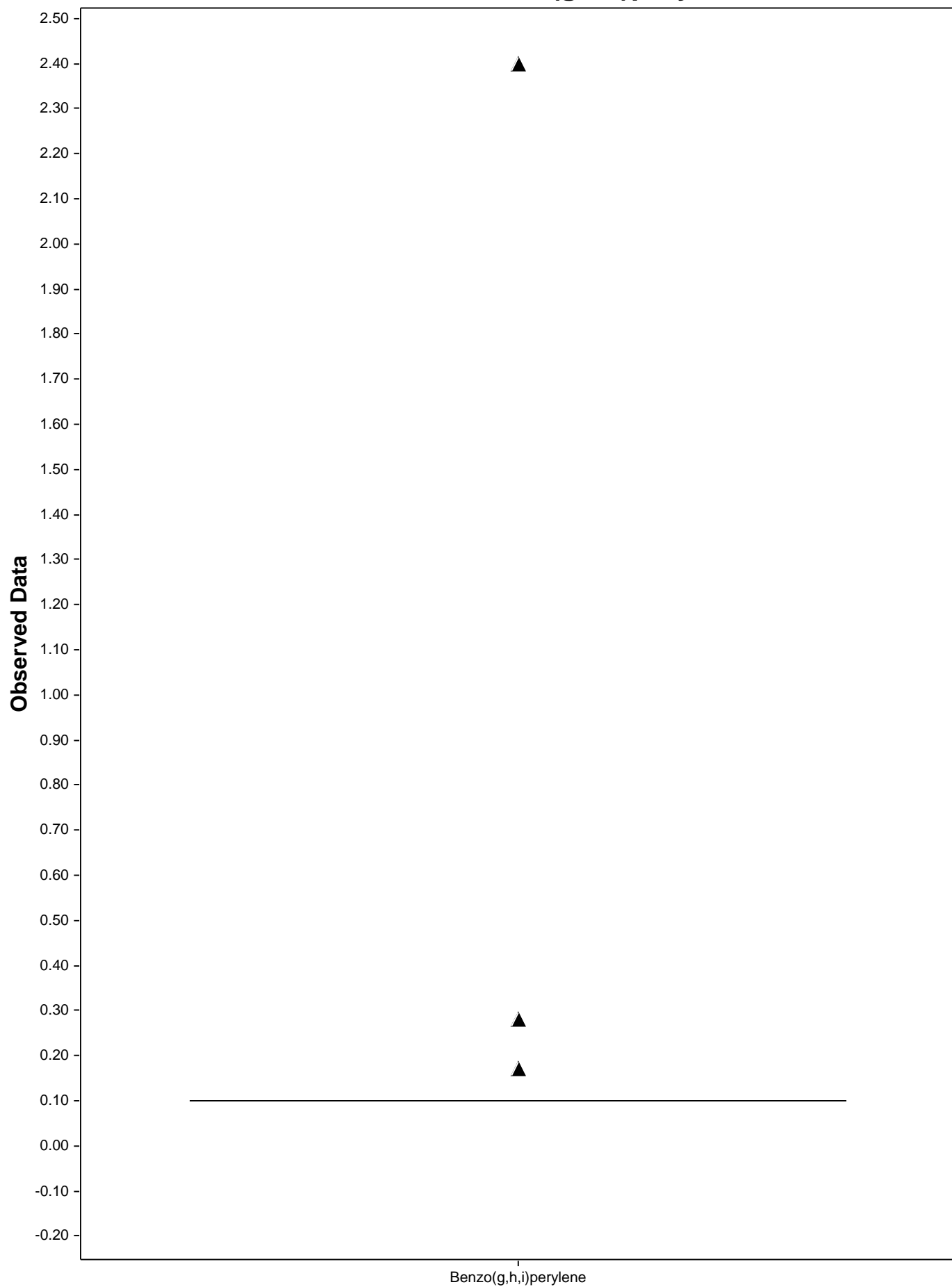
Box Plot for BaP



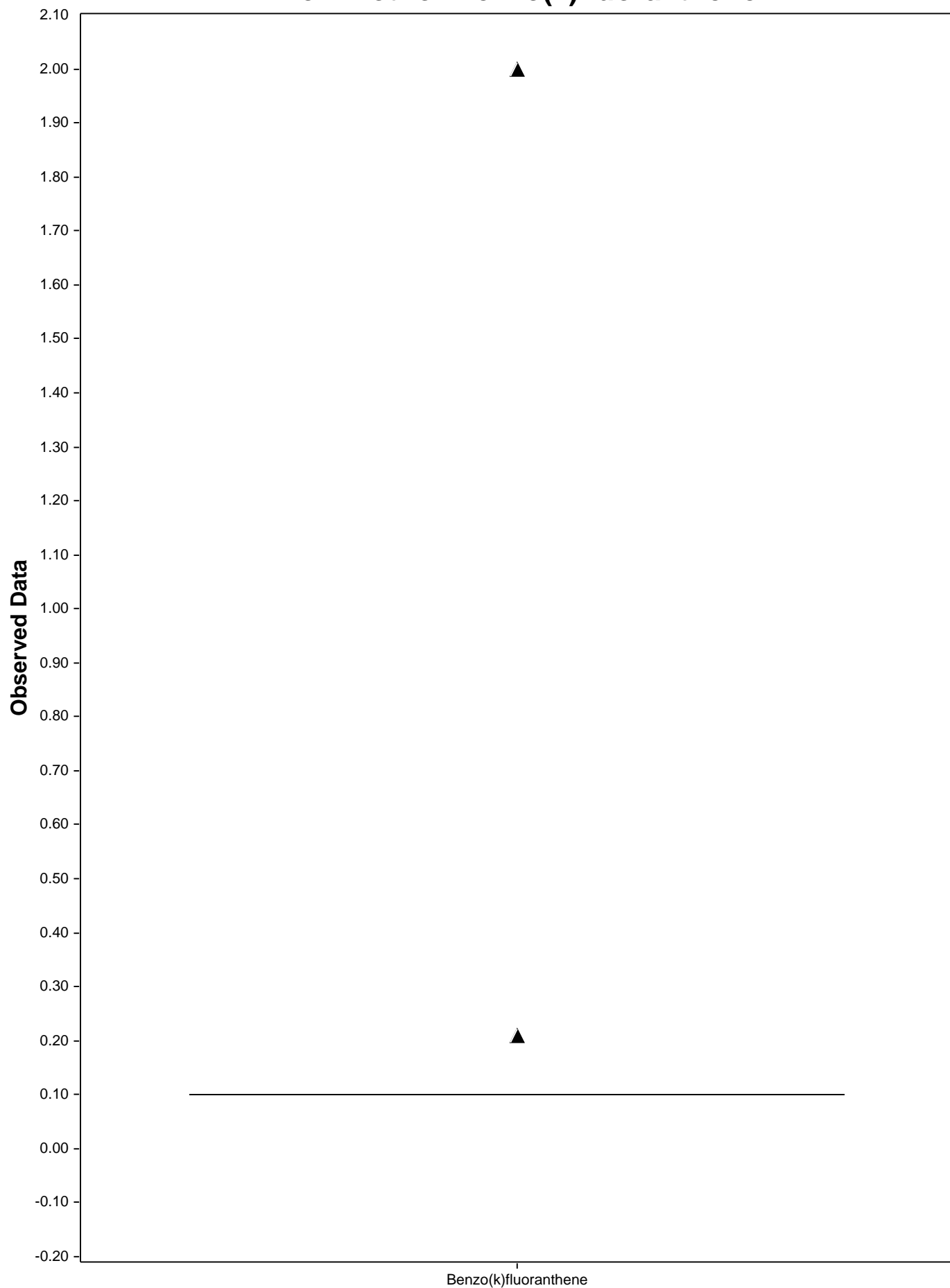
Box Plot for Benzo(b)fluoranthene



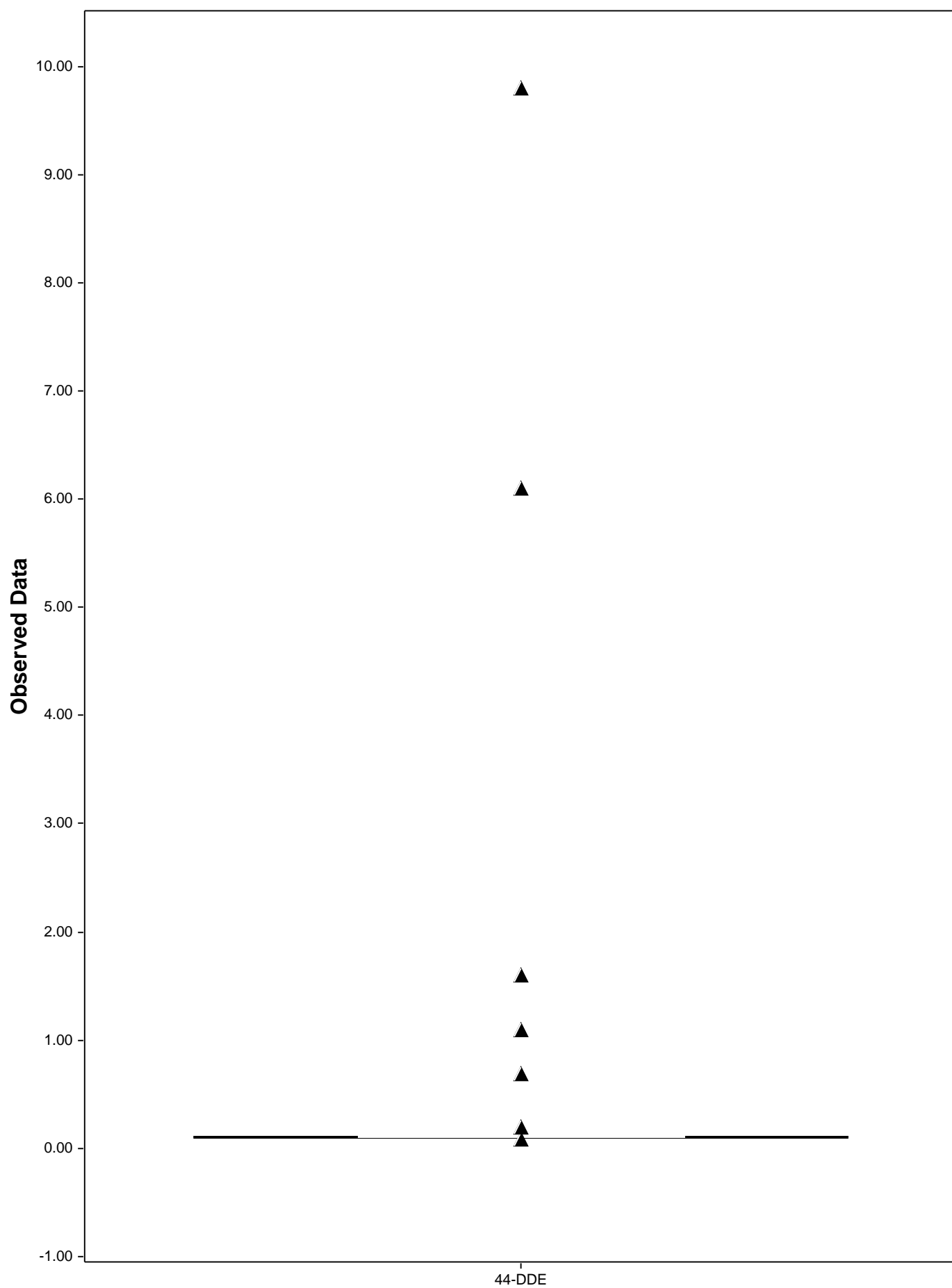
Box Plot for Benzo(g,h,i)perylene



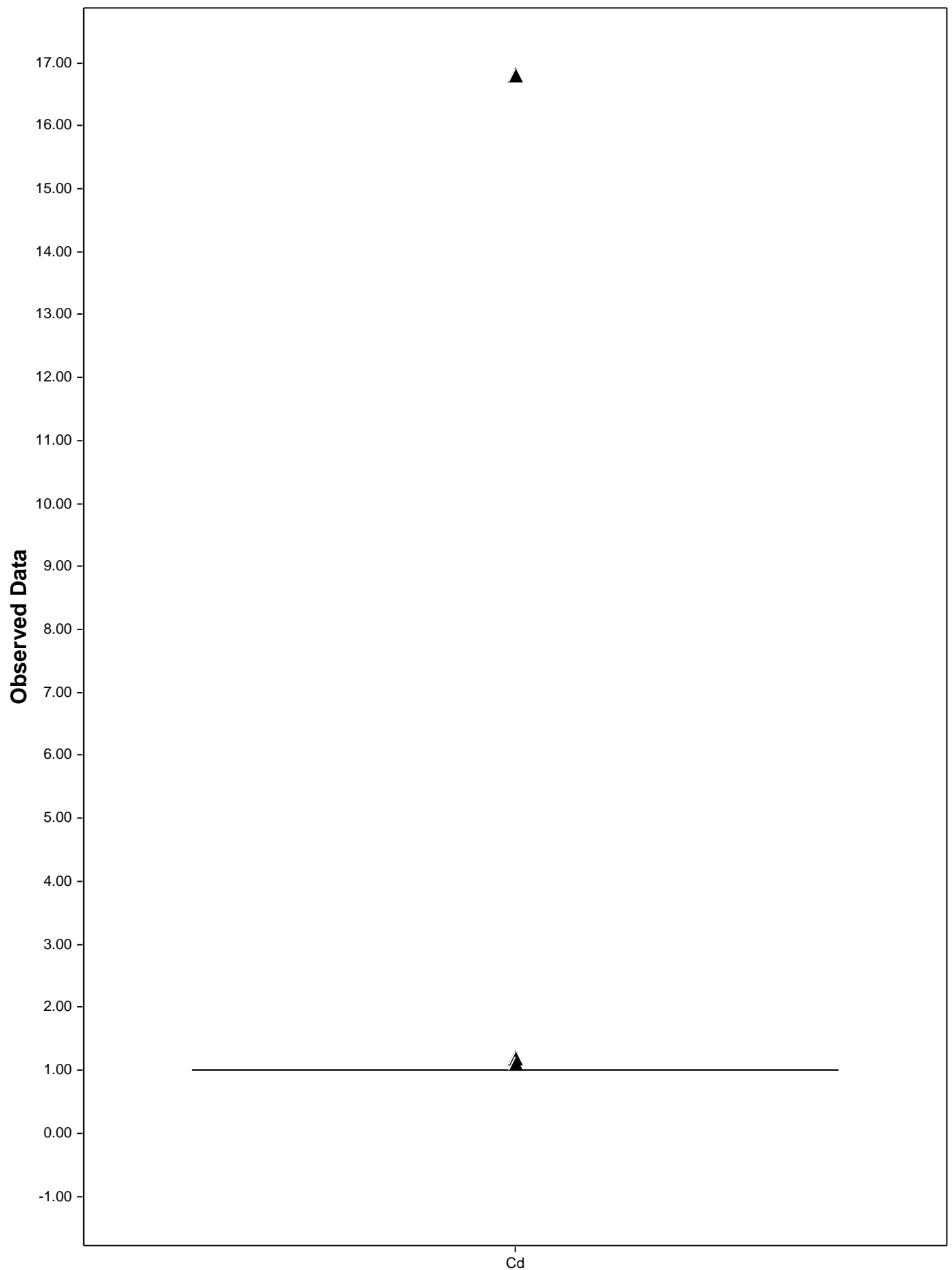
Box Plot for Benzo(k)fluoranthene



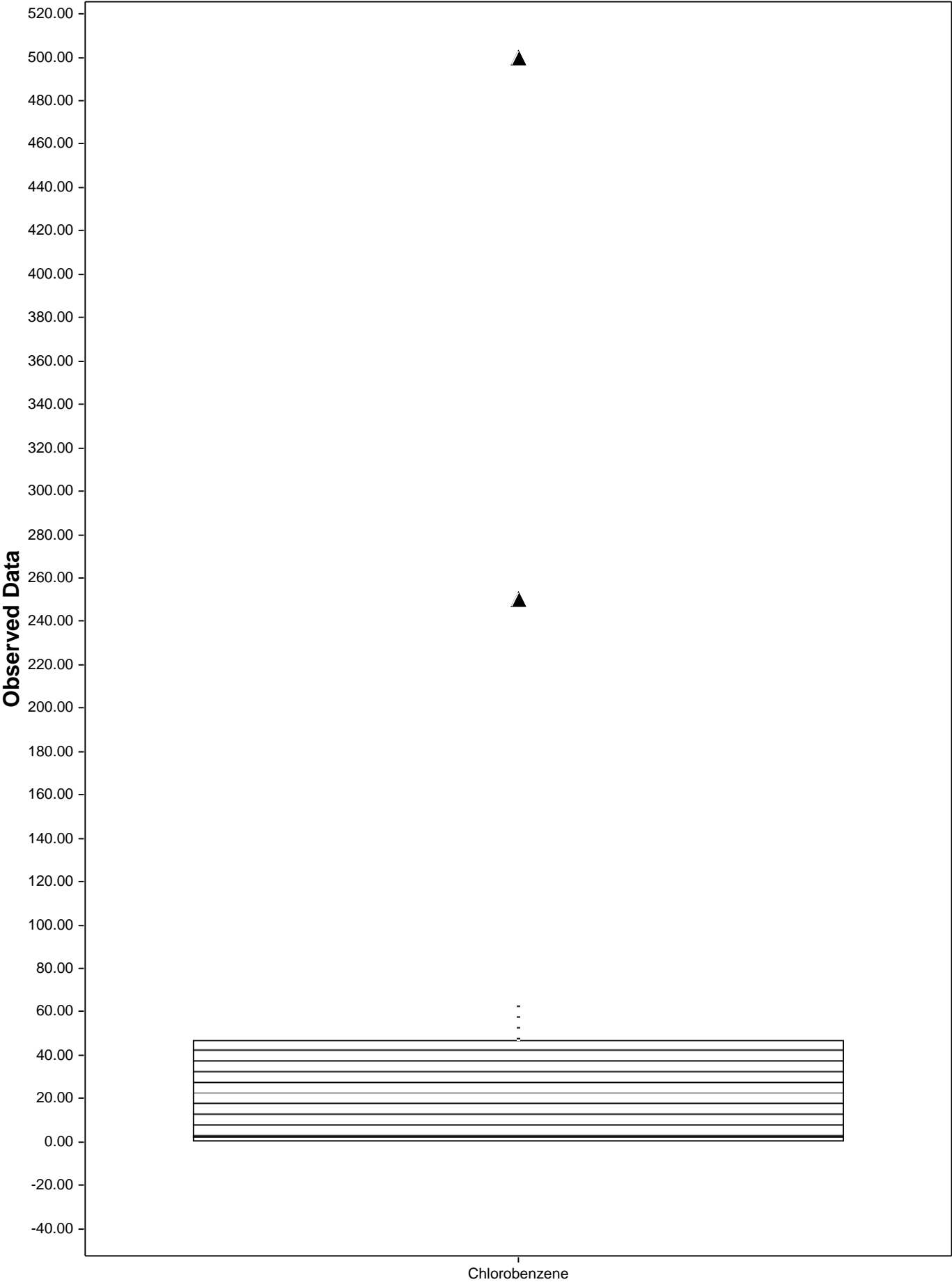
Box Plot for 44-DDE



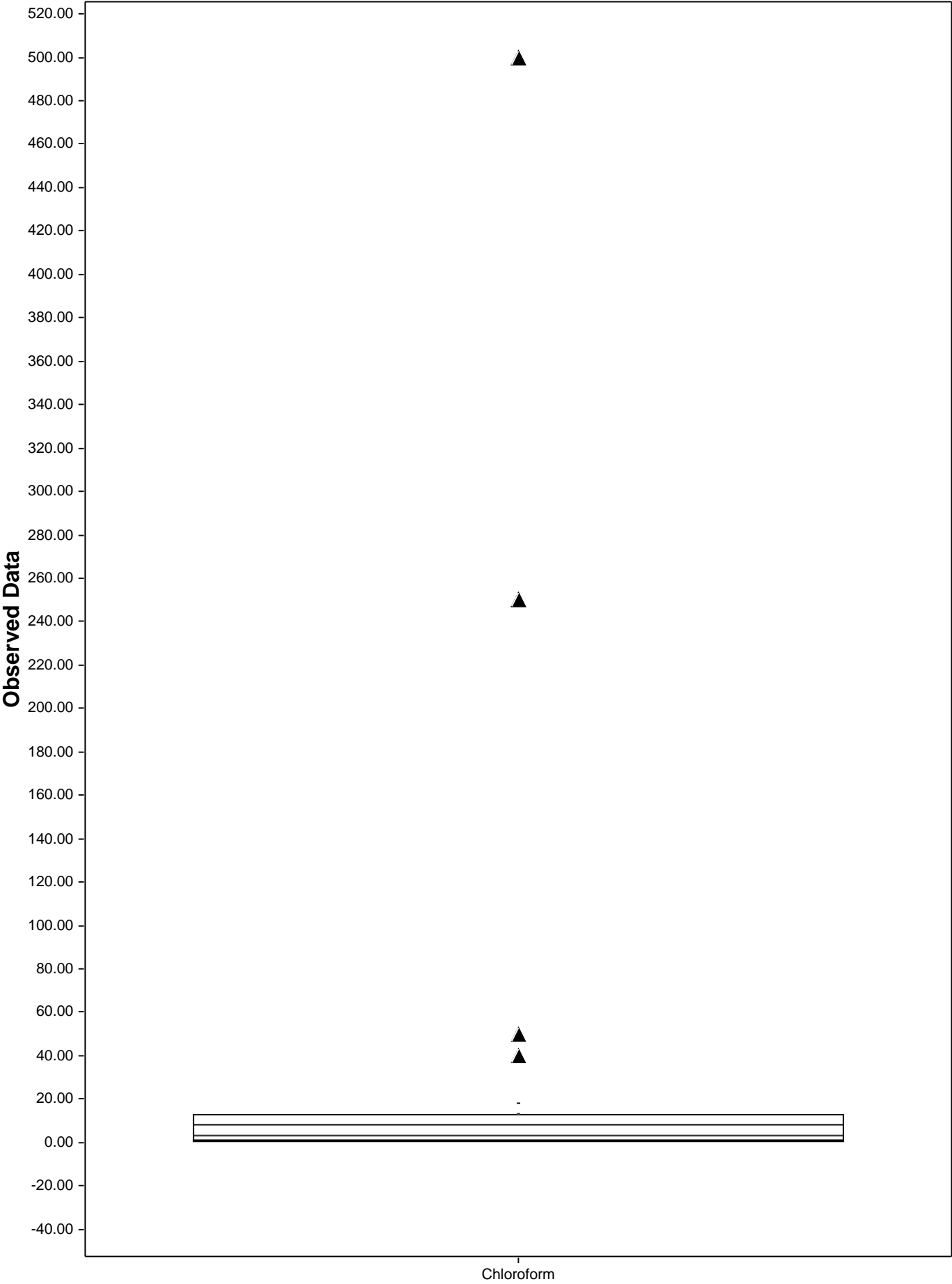
Box Plot for Cd



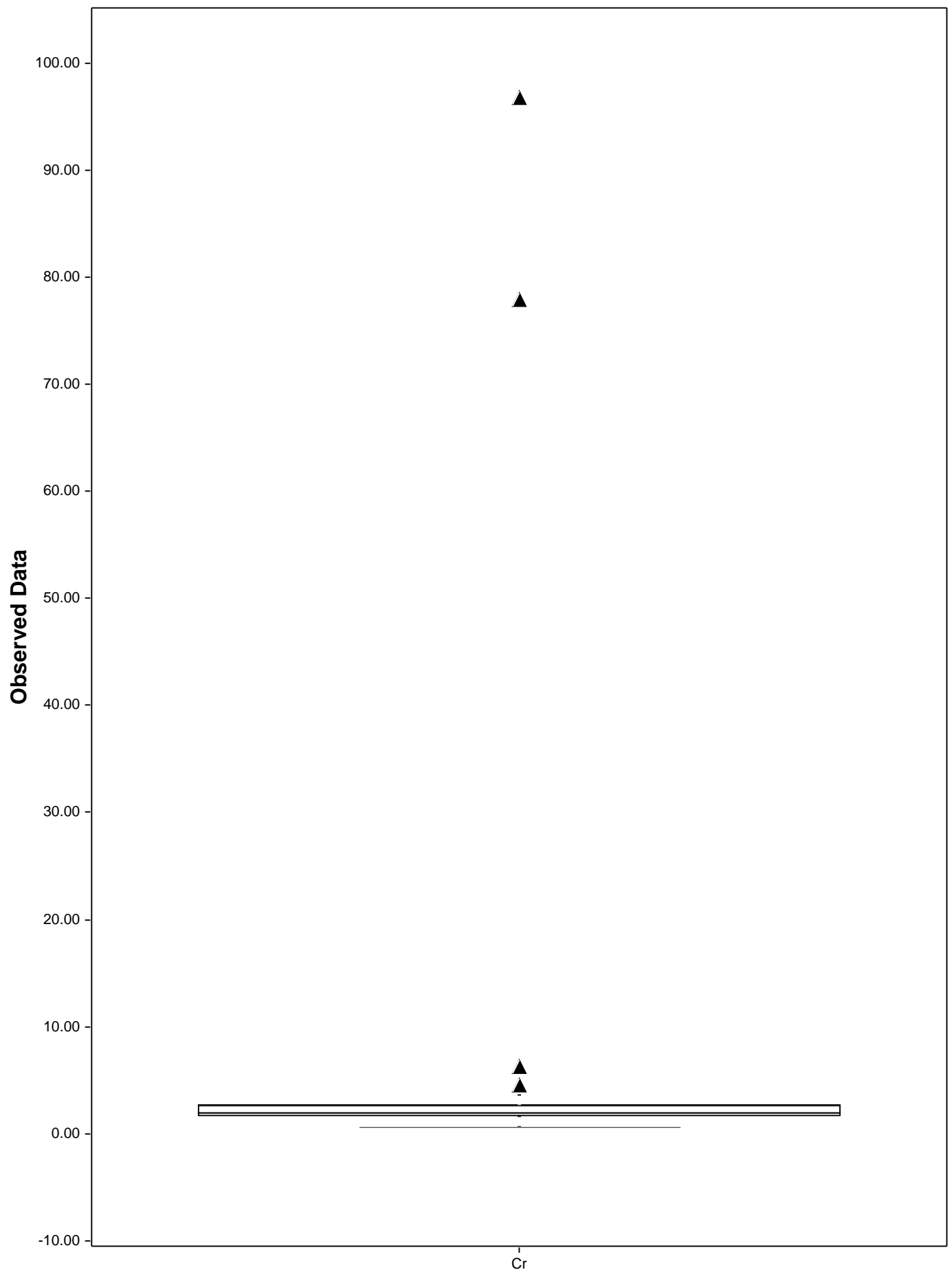
Box Plot for Chlorobenzene



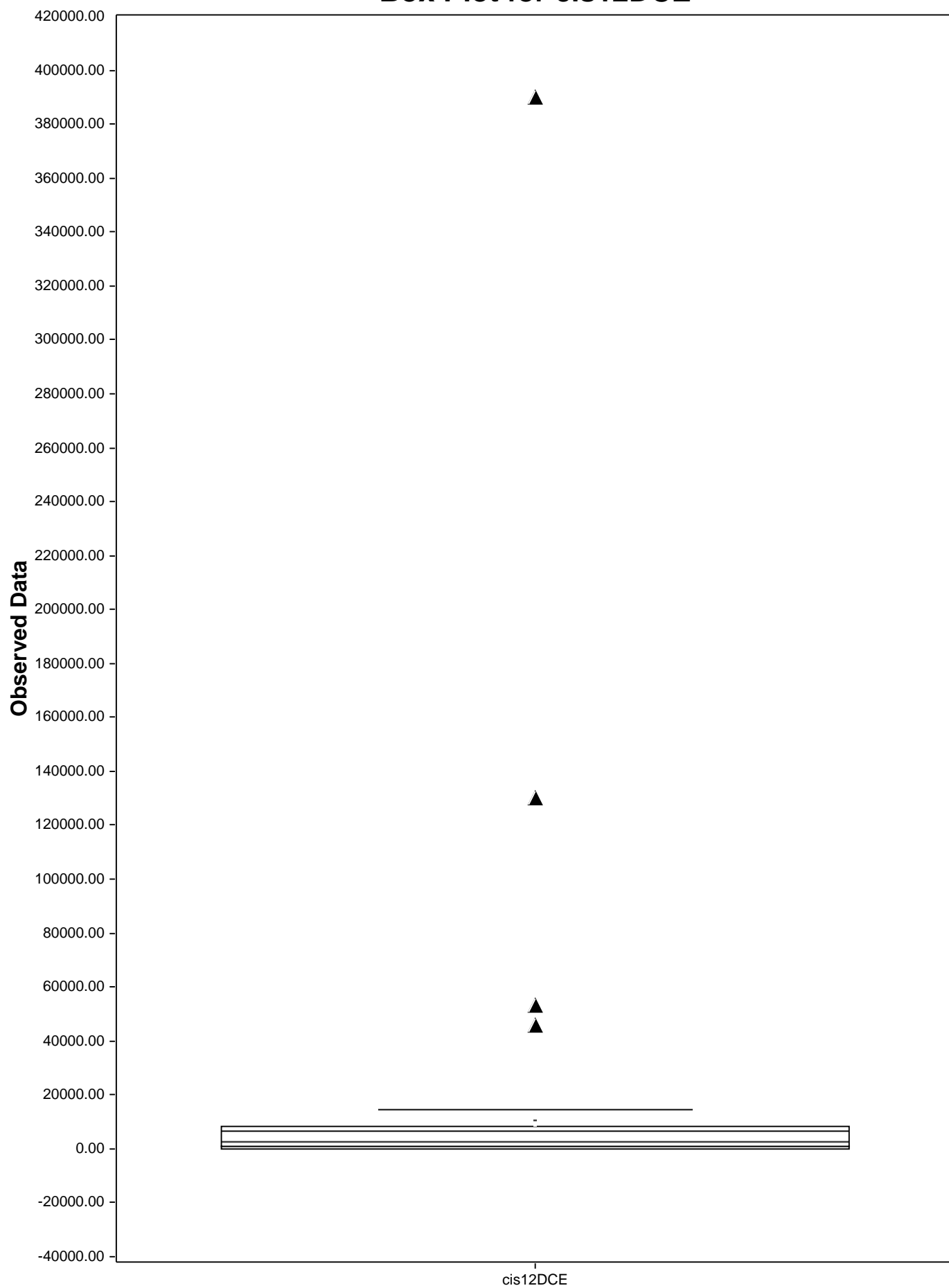
Box Plot for Chloroform



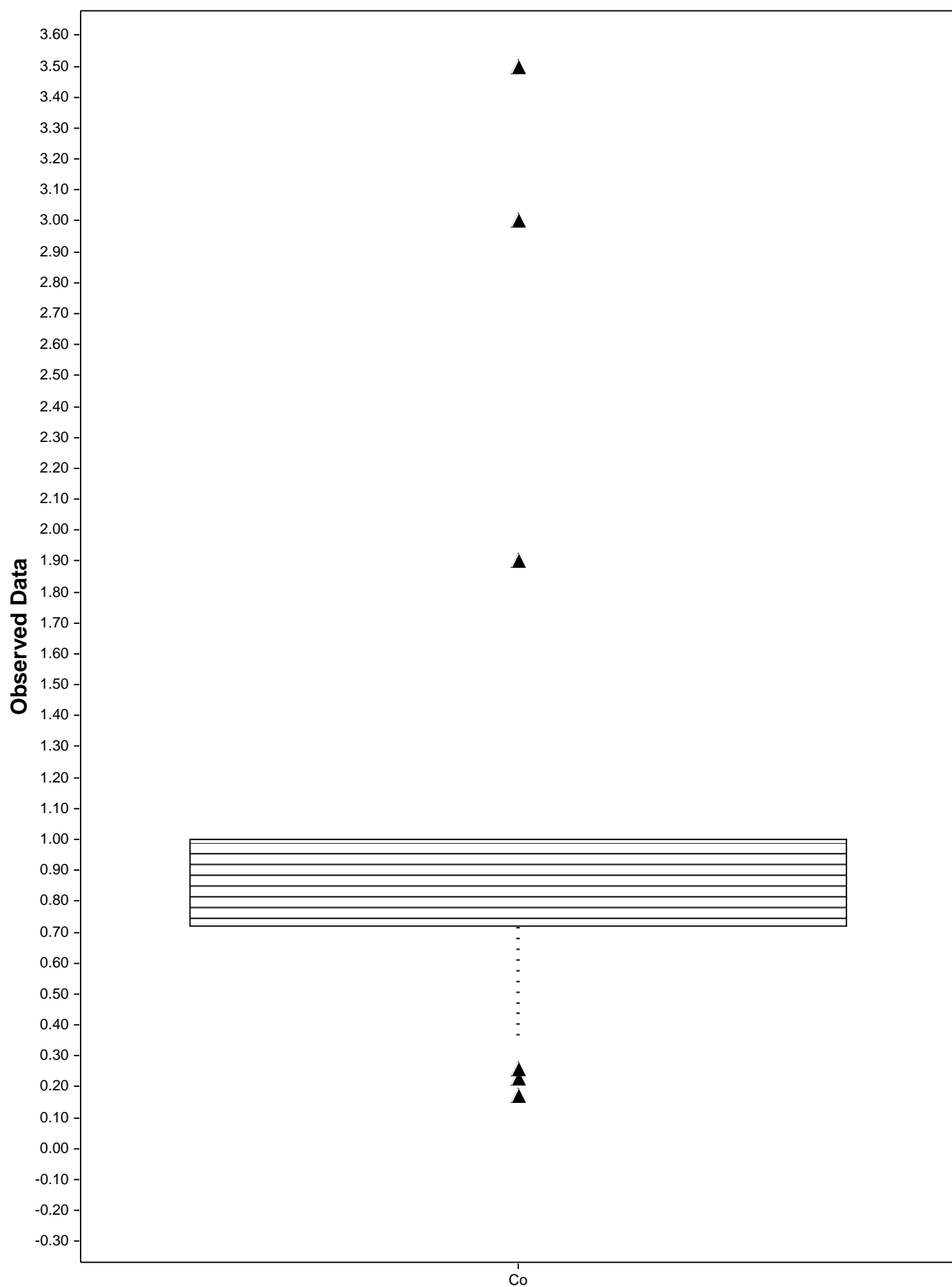
Box Plot for Cr



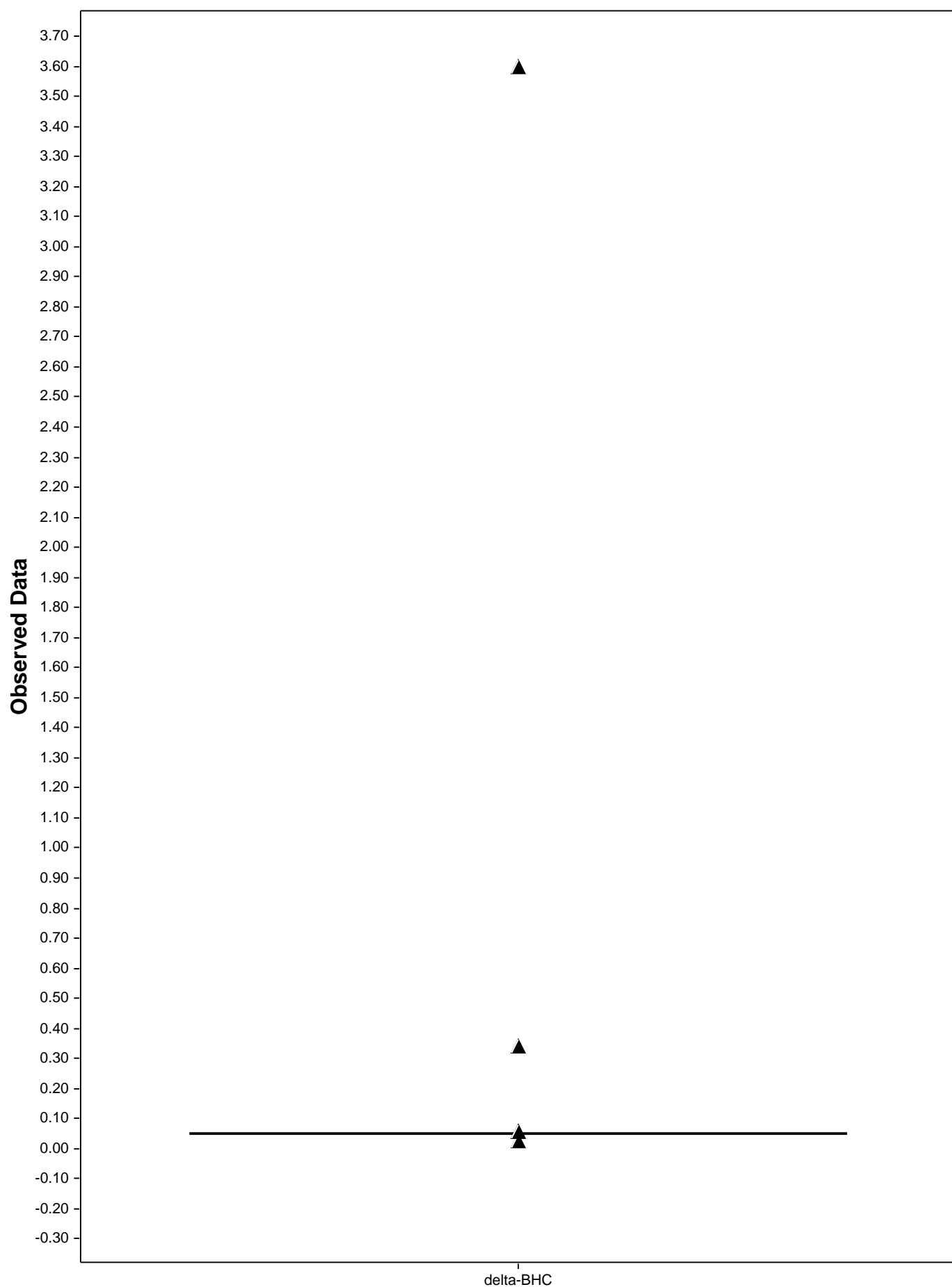
Box Plot for cis12DCE



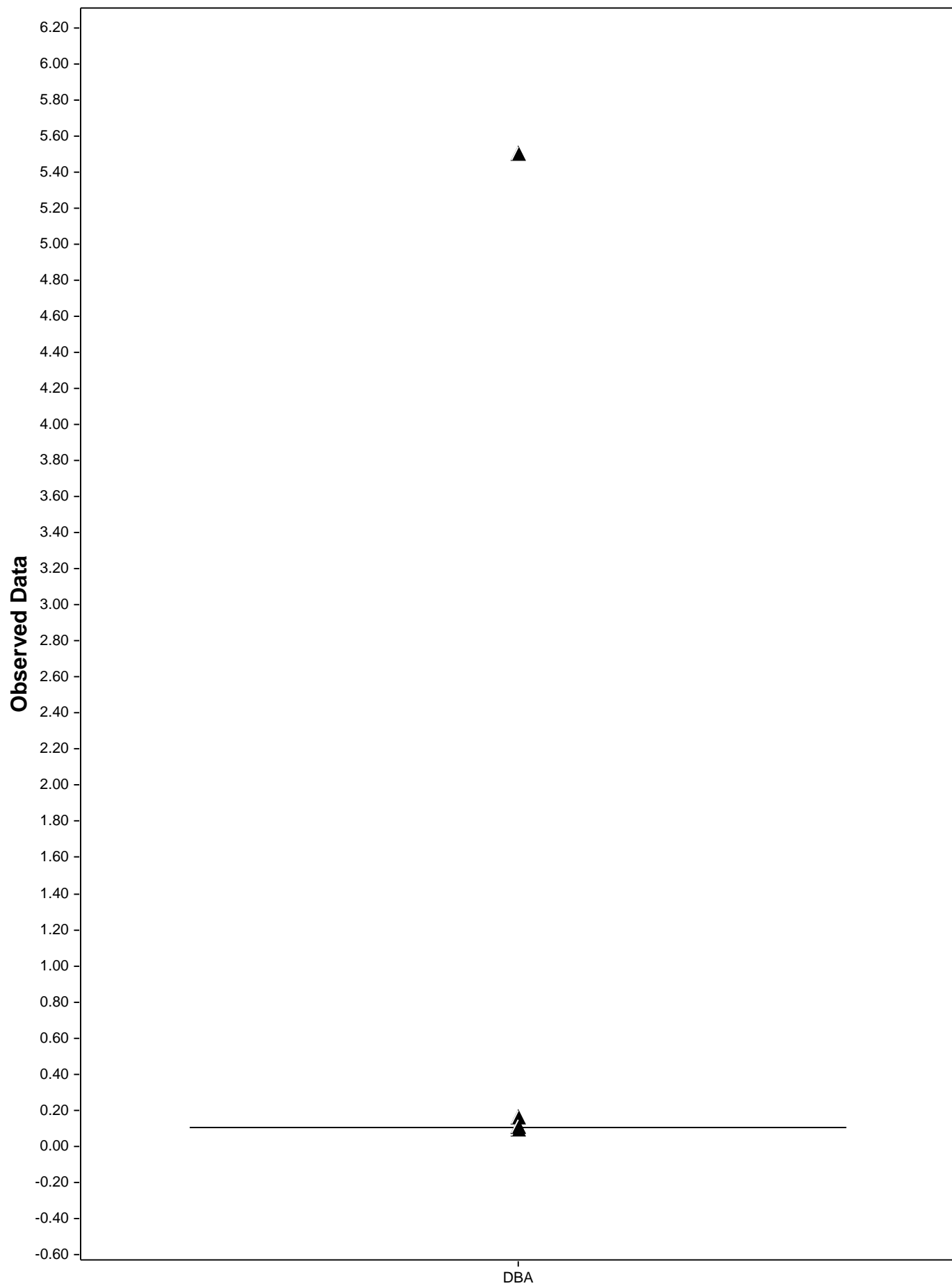
Box Plot for Co



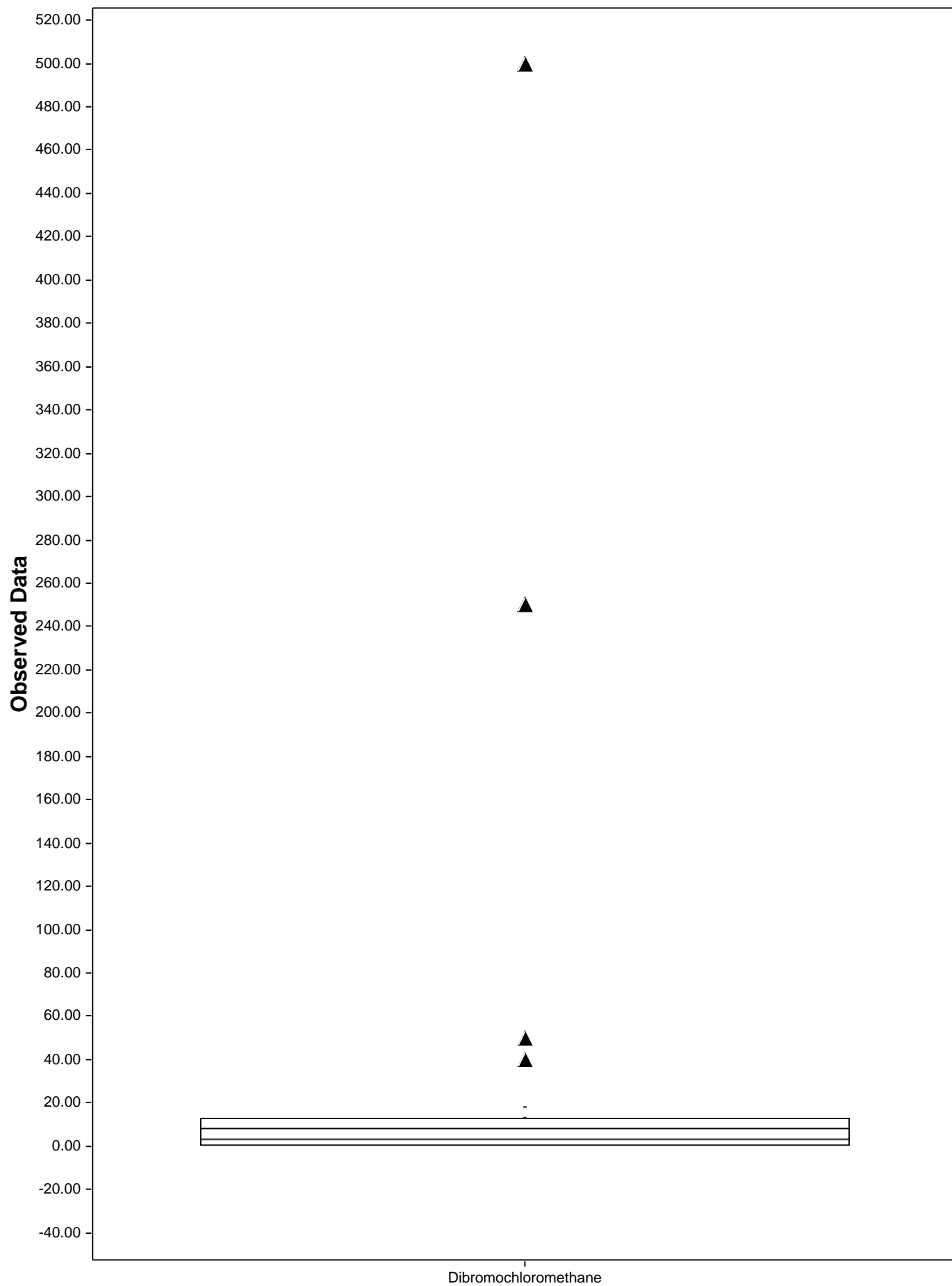
Box Plot for delta-BHC



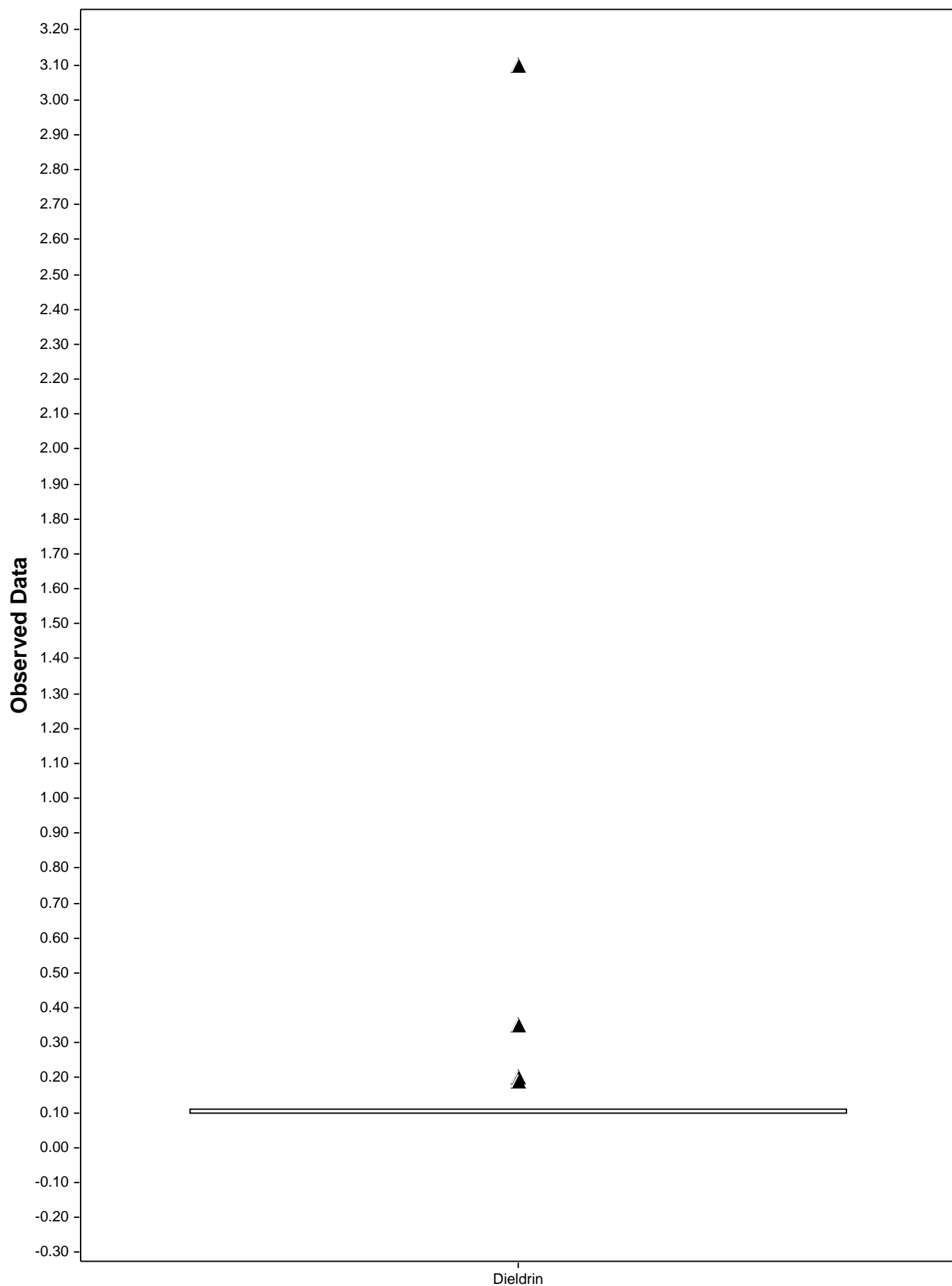
Box Plot for DBA



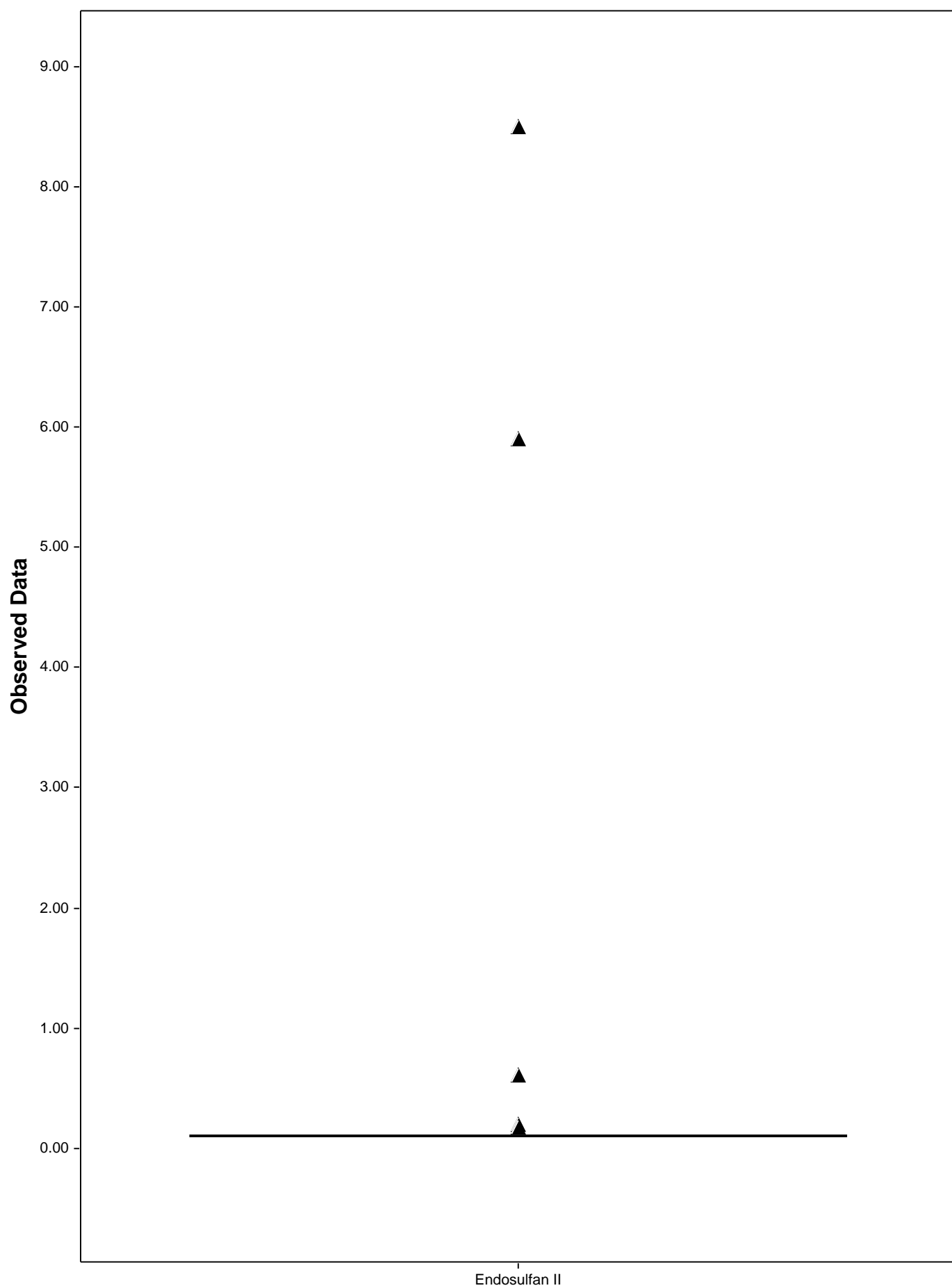
Box Plot for Dibromochloromethane



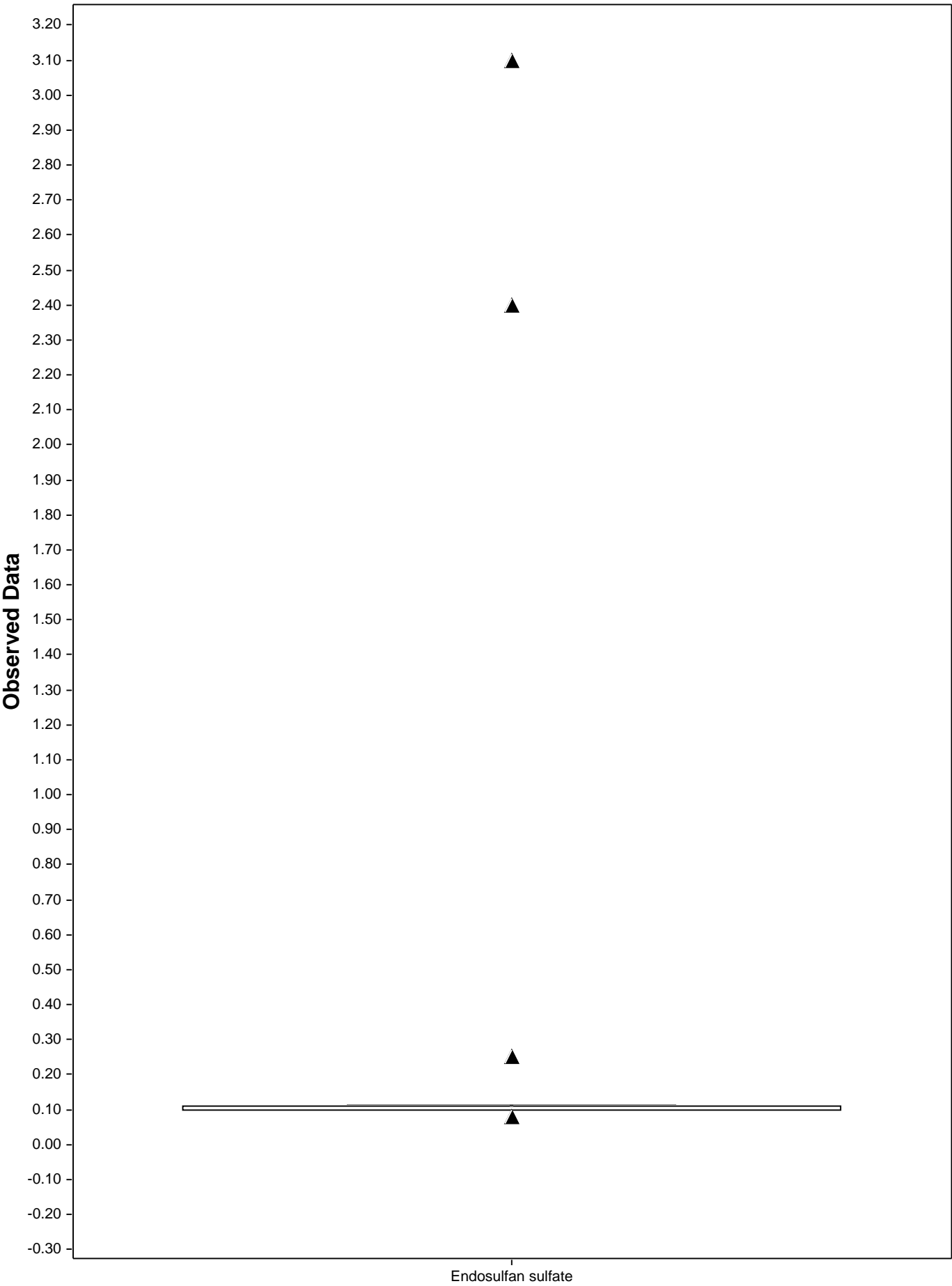
Box Plot for Dieldrin



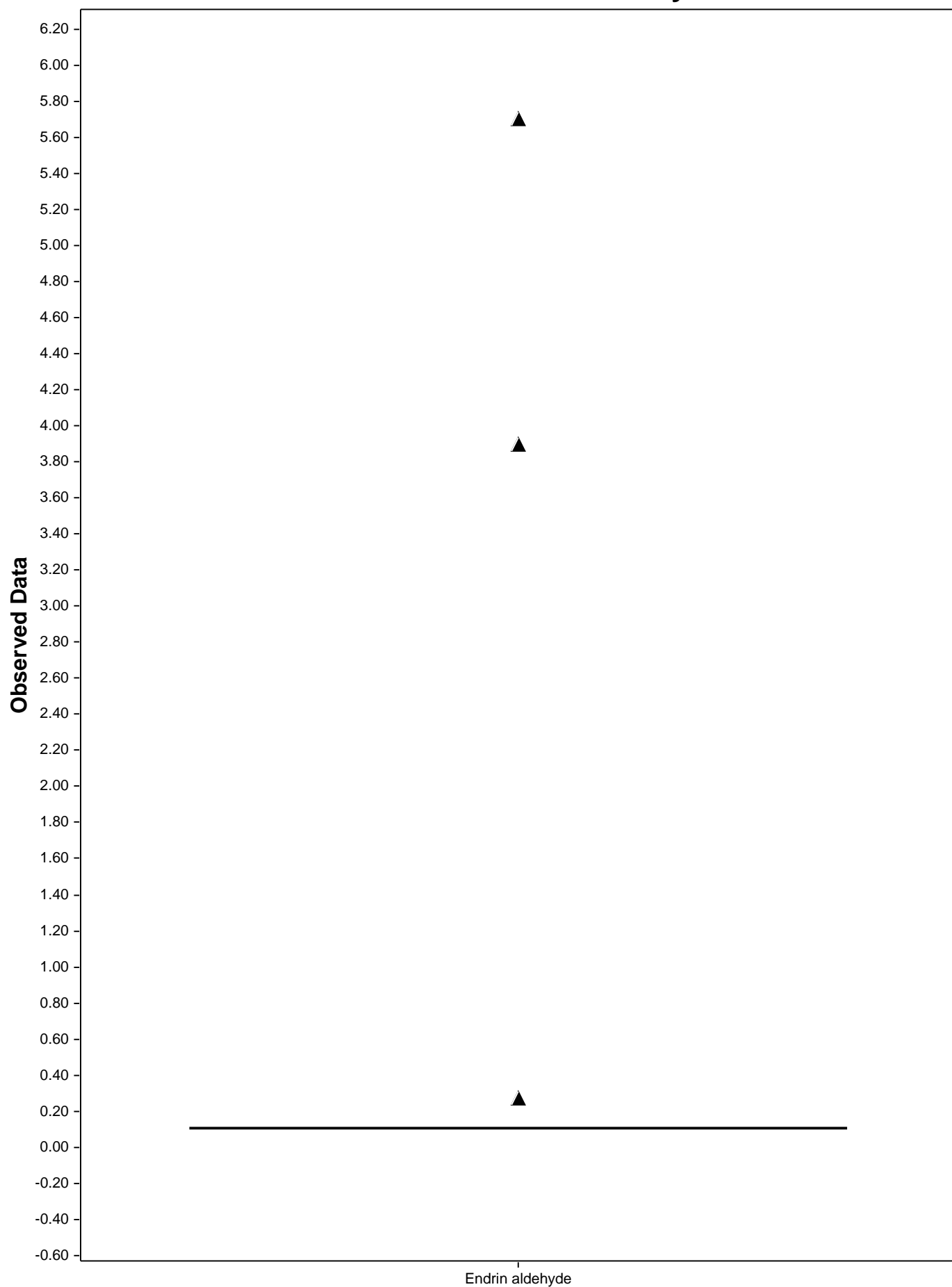
Box Plot for Endosulfan II



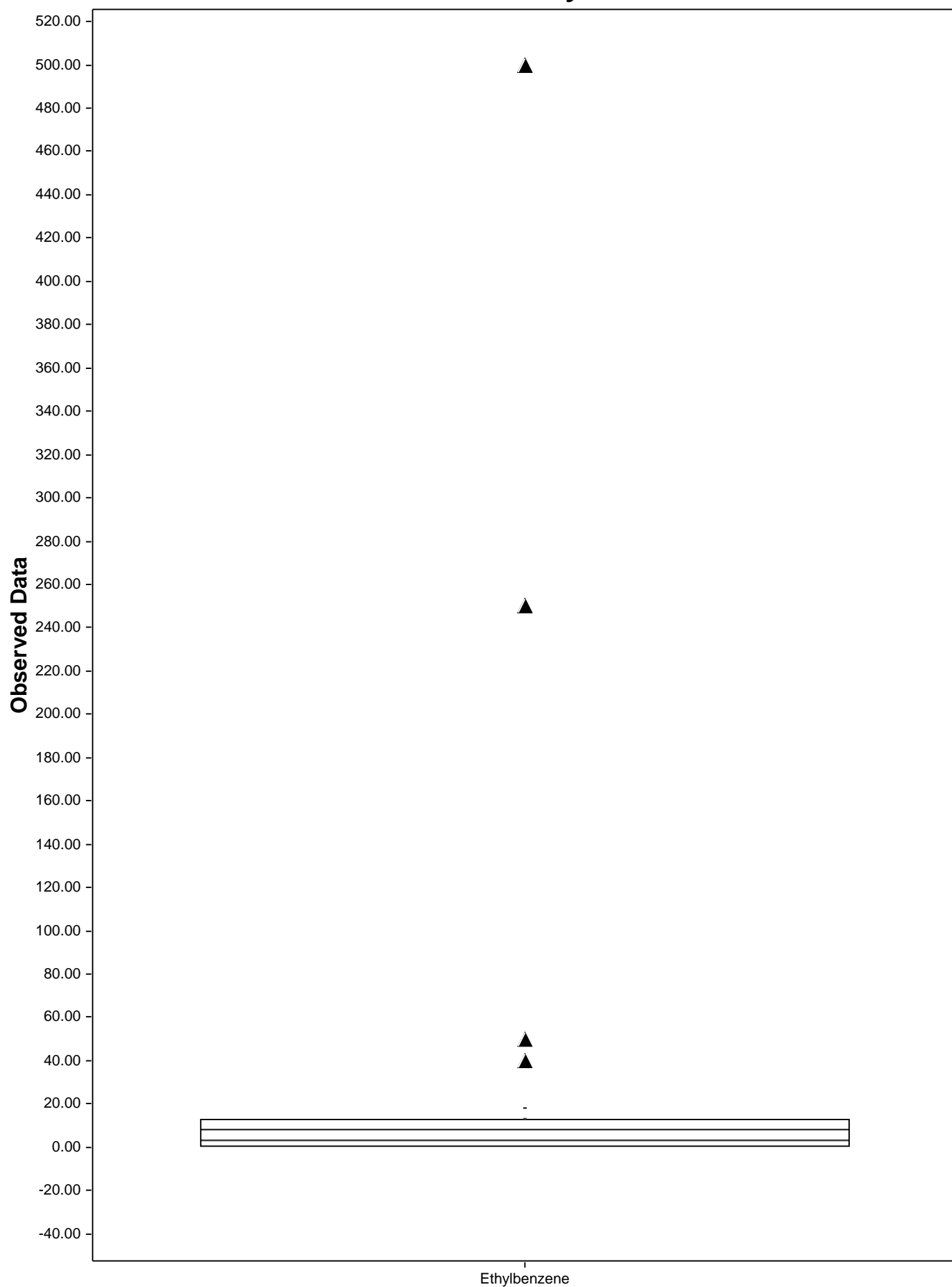
Box Plot for Endosulfan sulfate



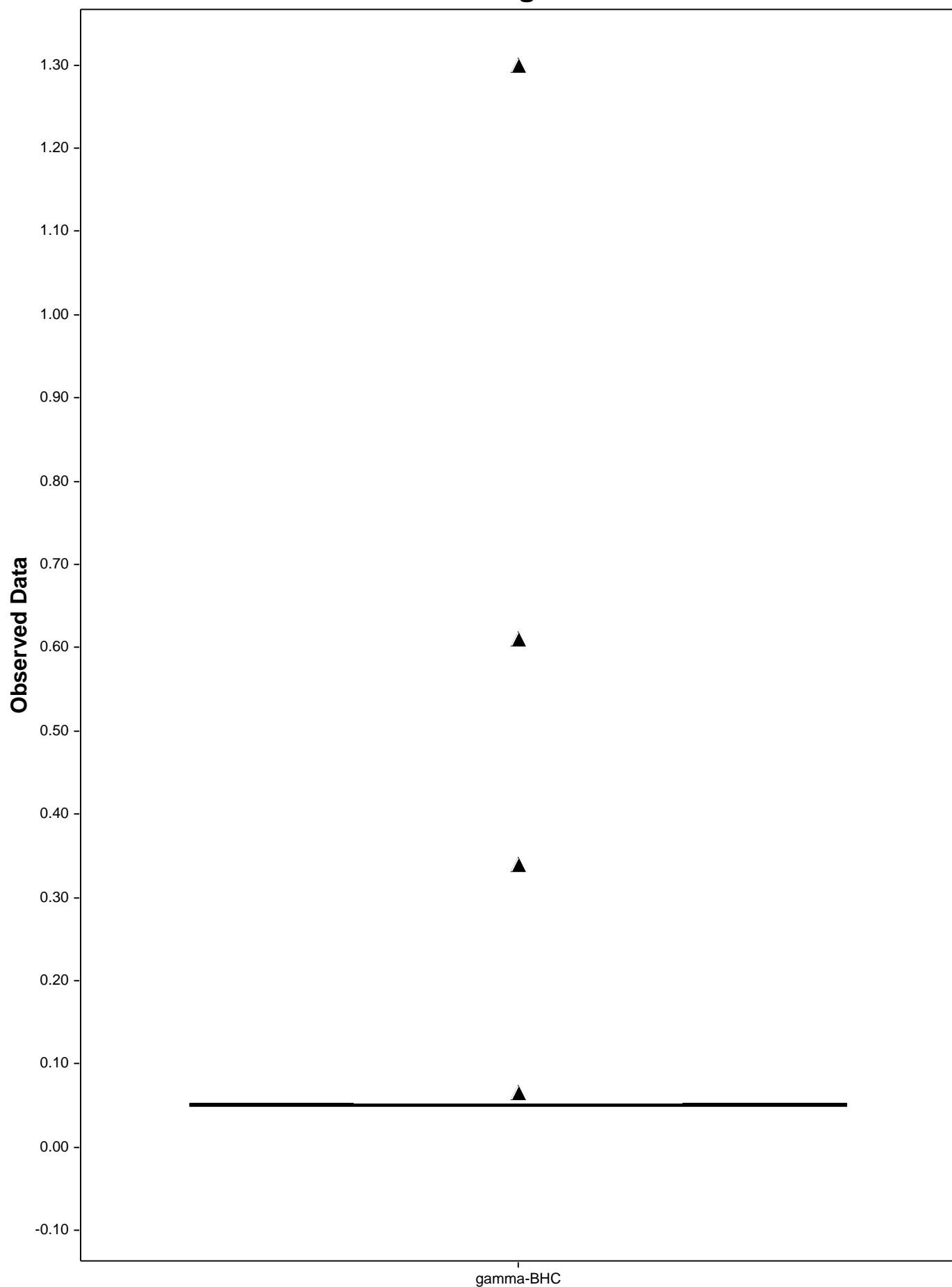
Box Plot for Endrin aldehyde



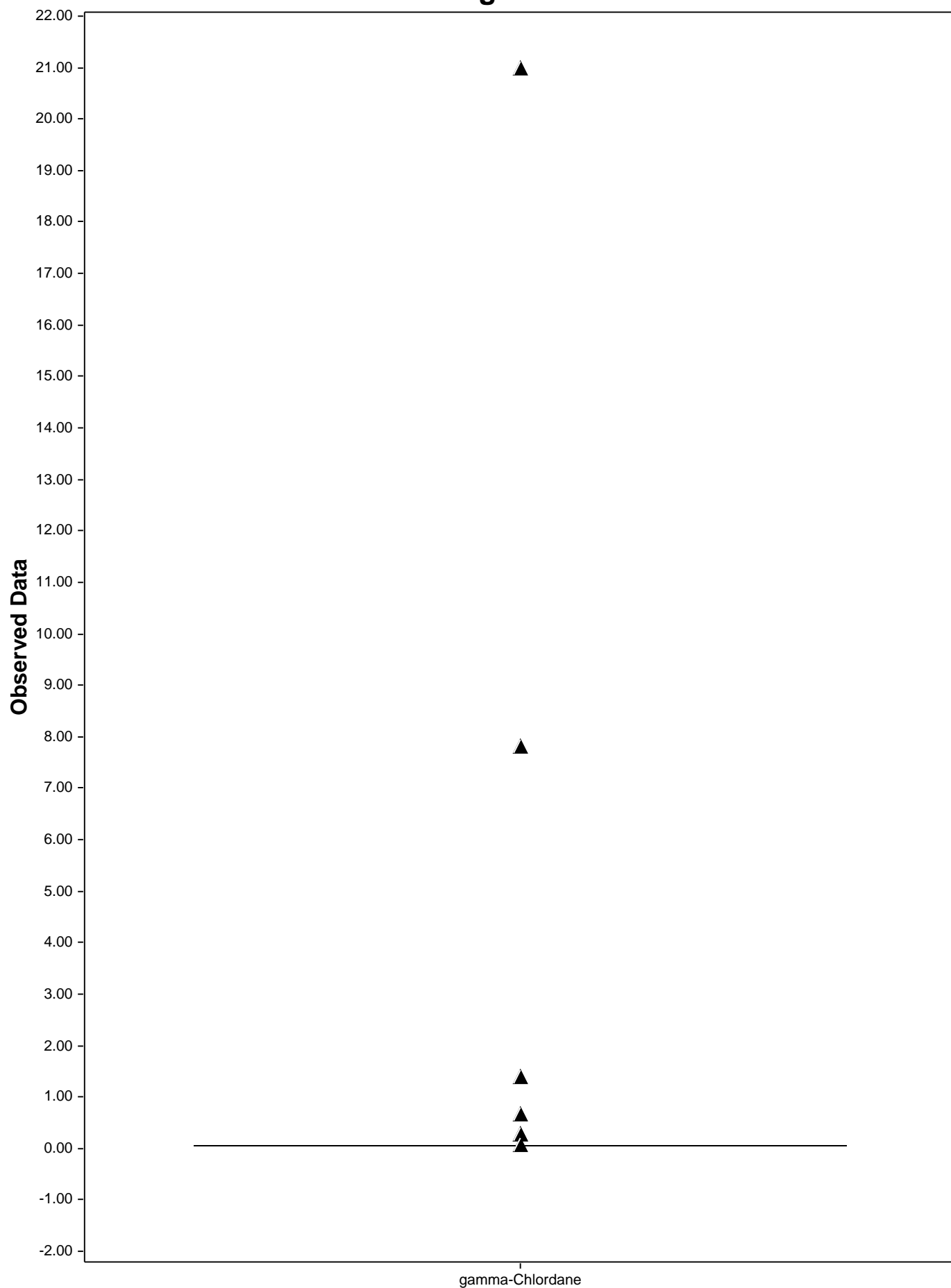
Box Plot for Ethylbenzene



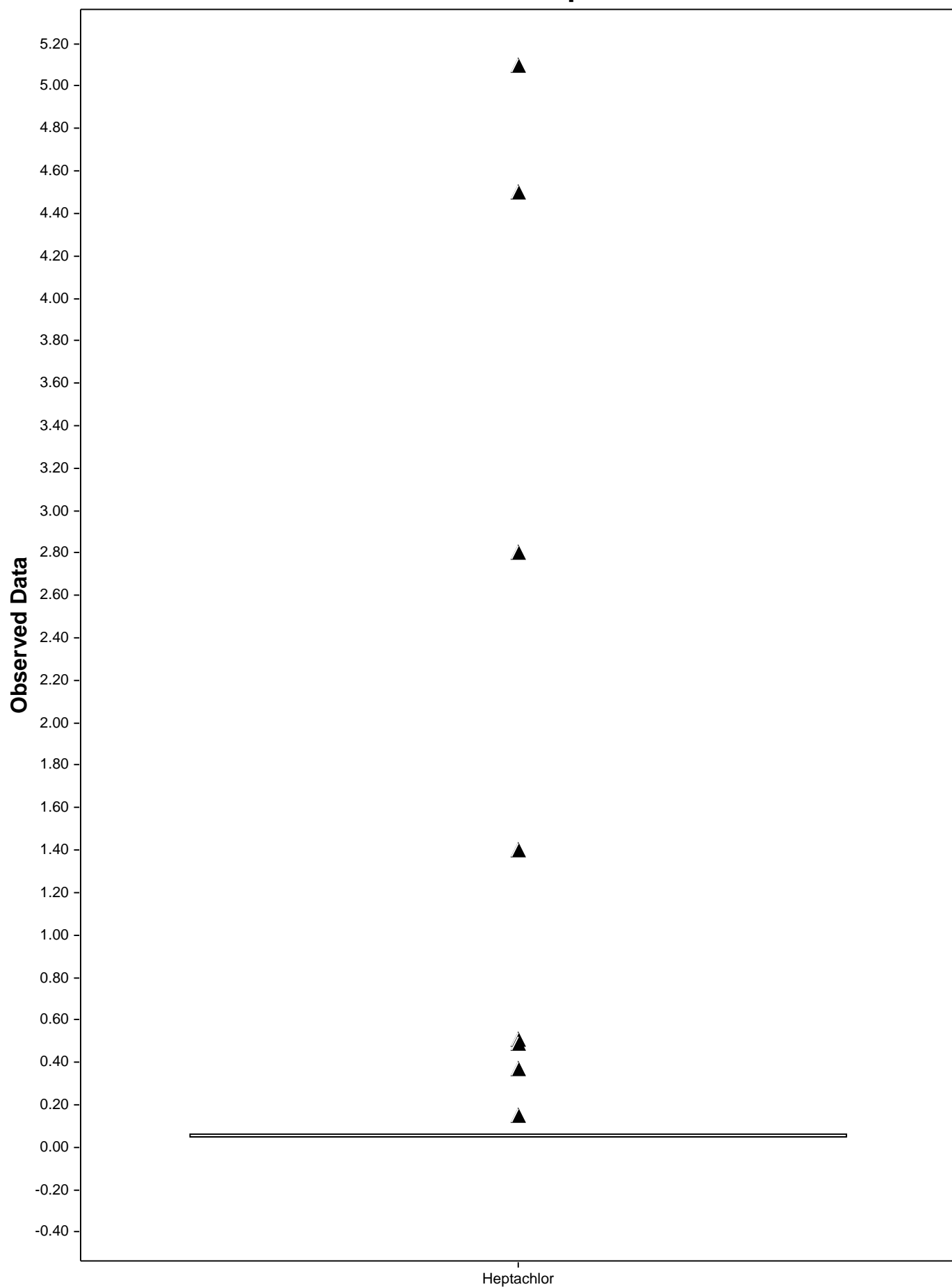
Box Plot for gamma-BHC



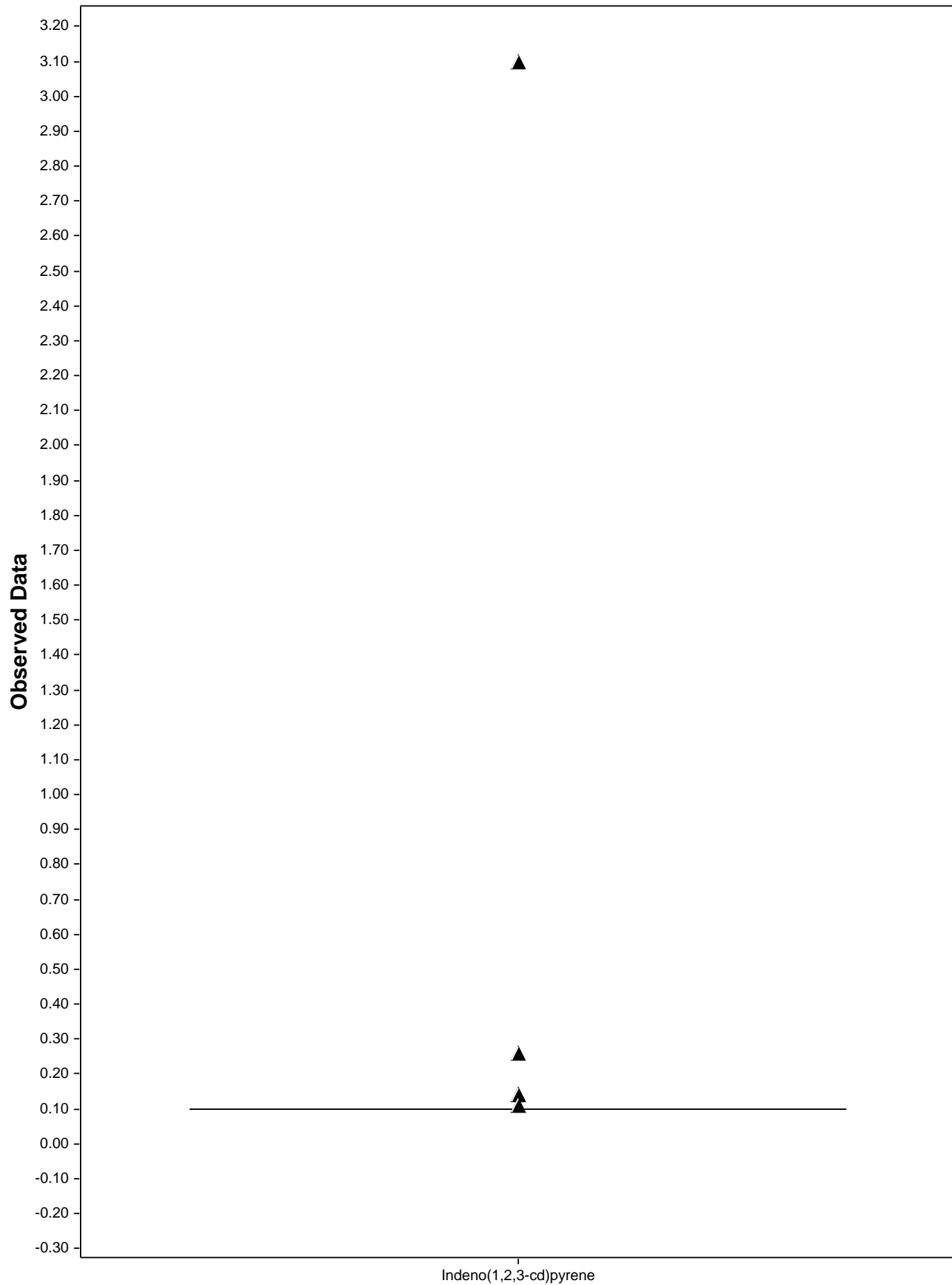
Box Plot for gamma-Chlordane



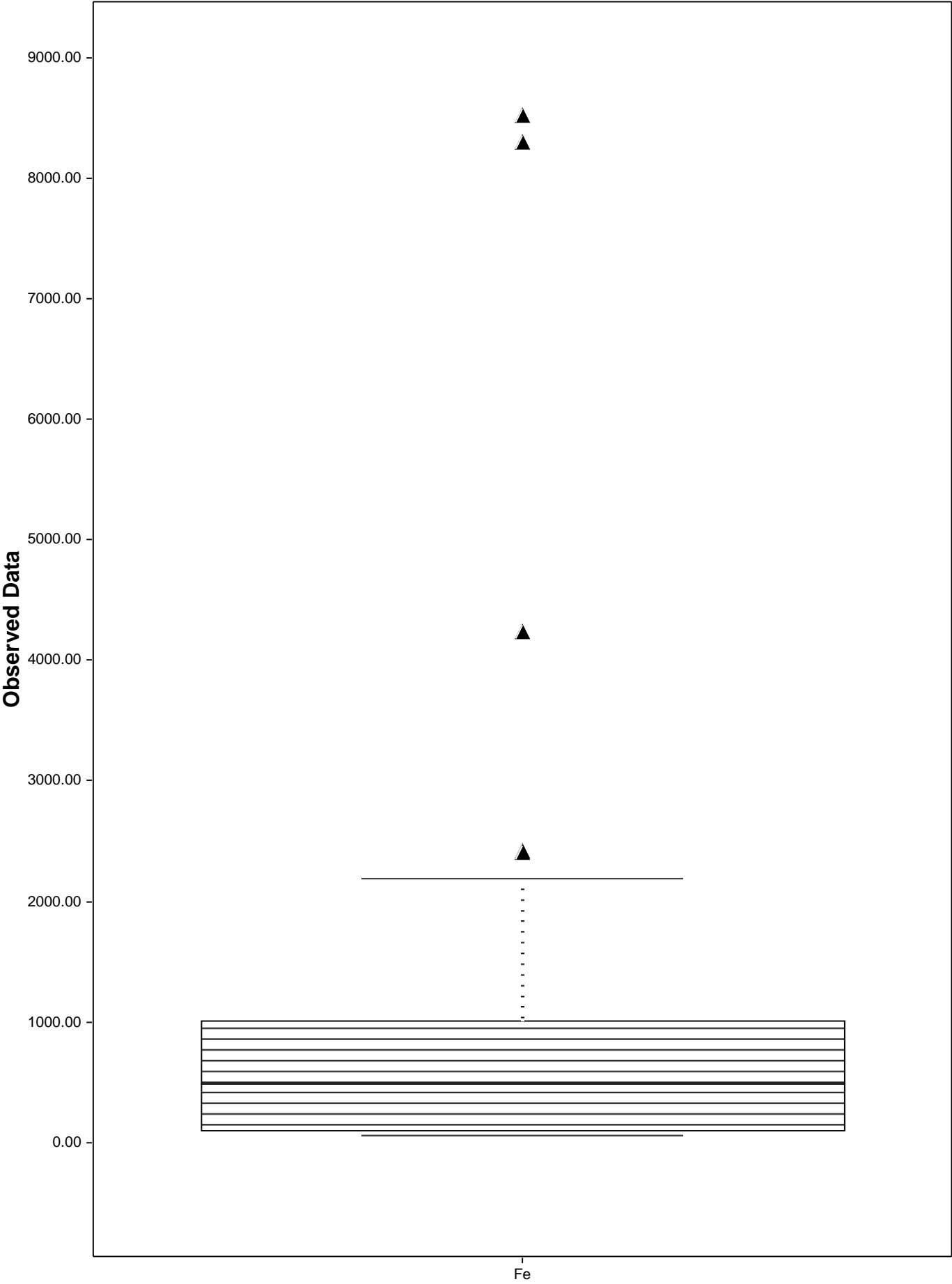
Box Plot for Heptachlor



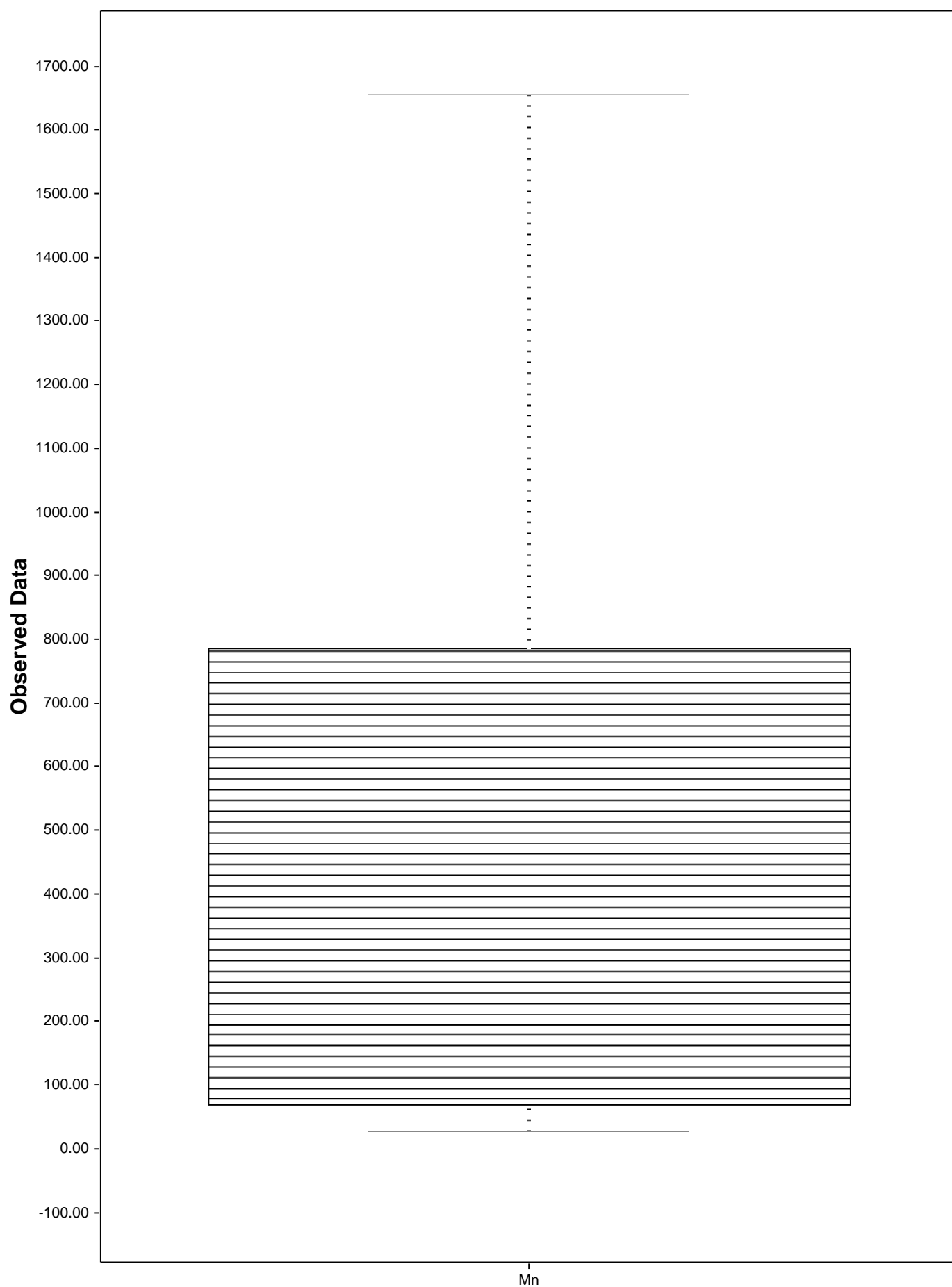
Box Plot for Indeno(1,2,3-cd)pyrene



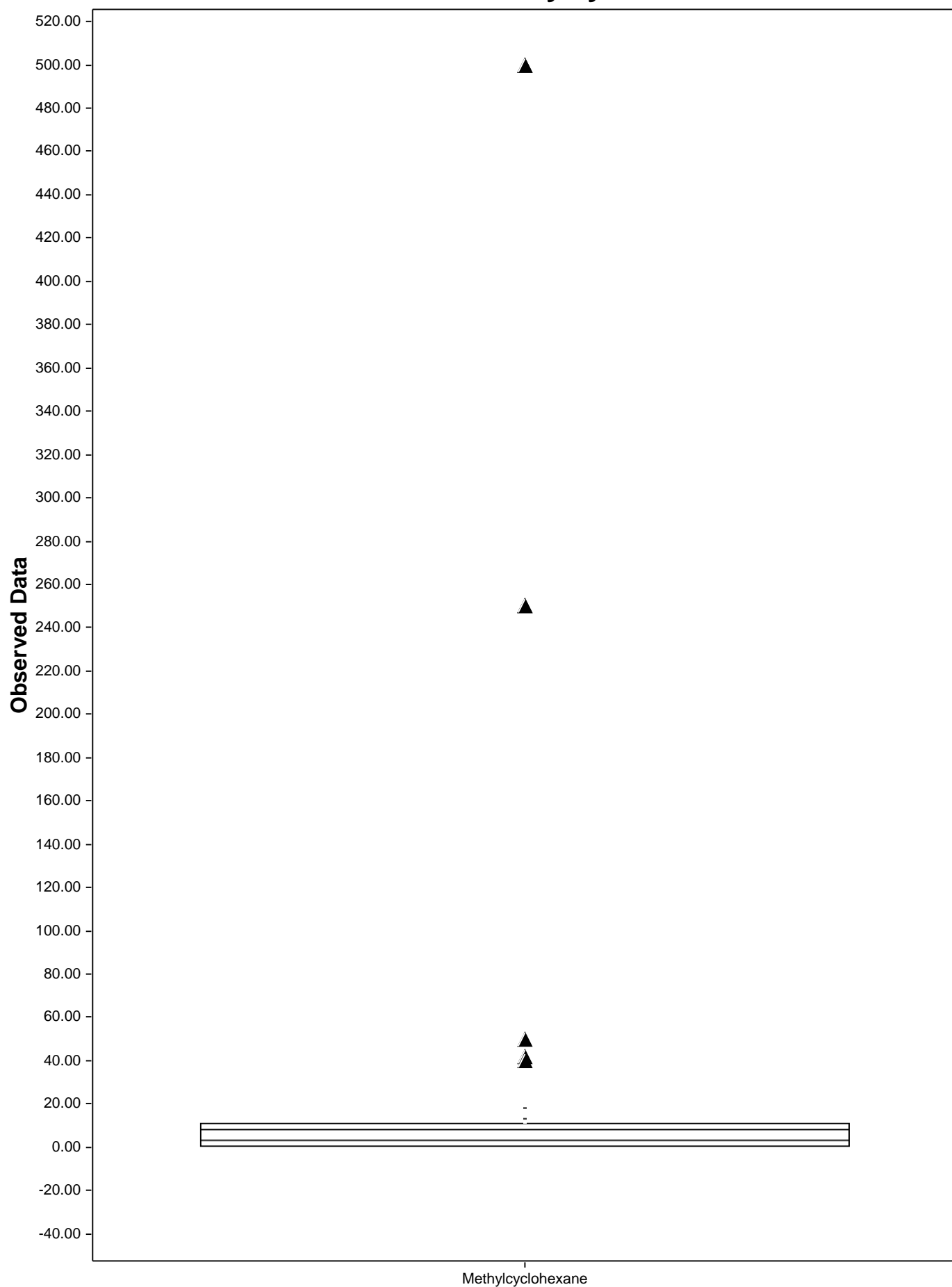
Box Plot for Fe



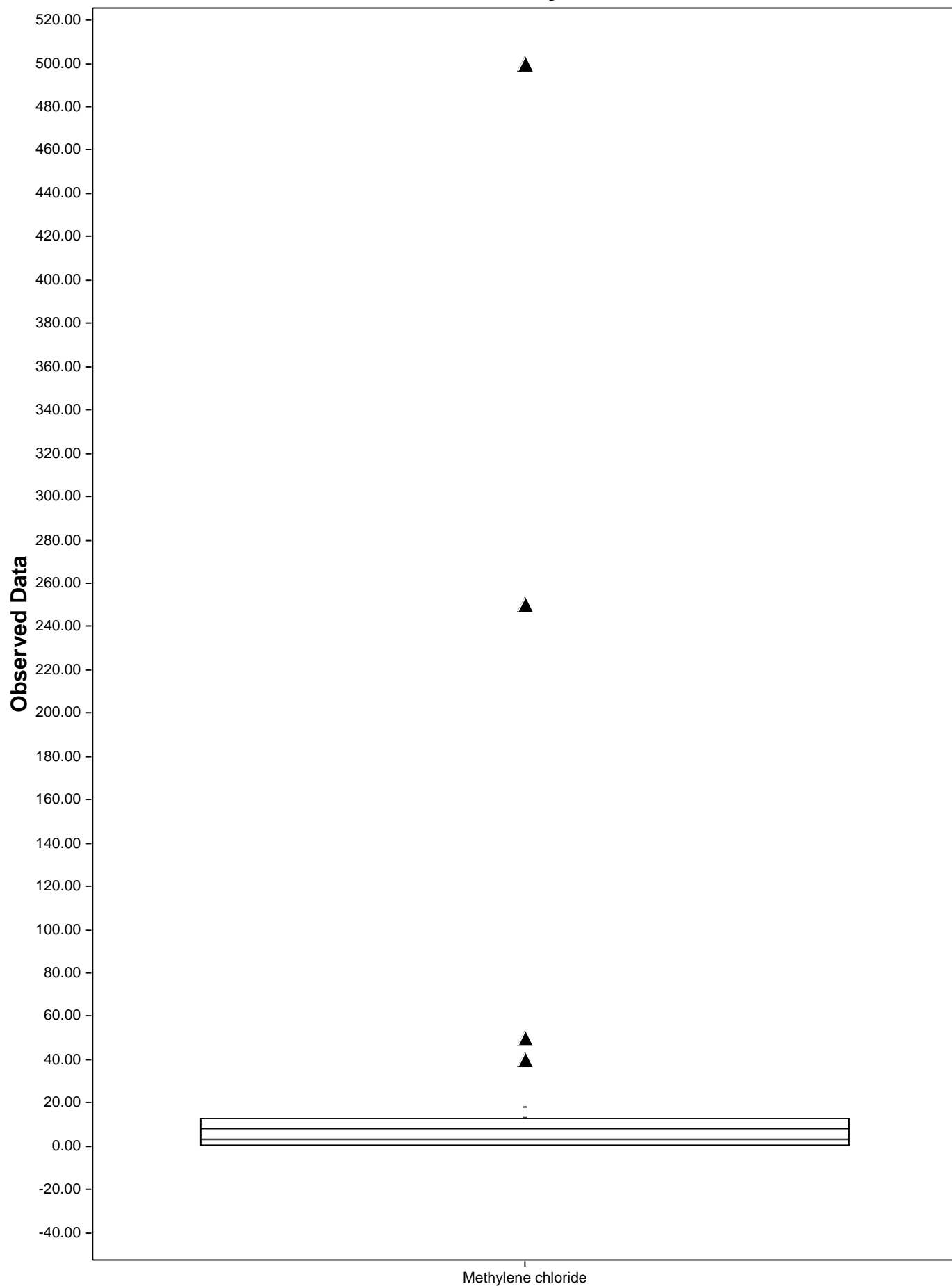
Box Plot for Mn



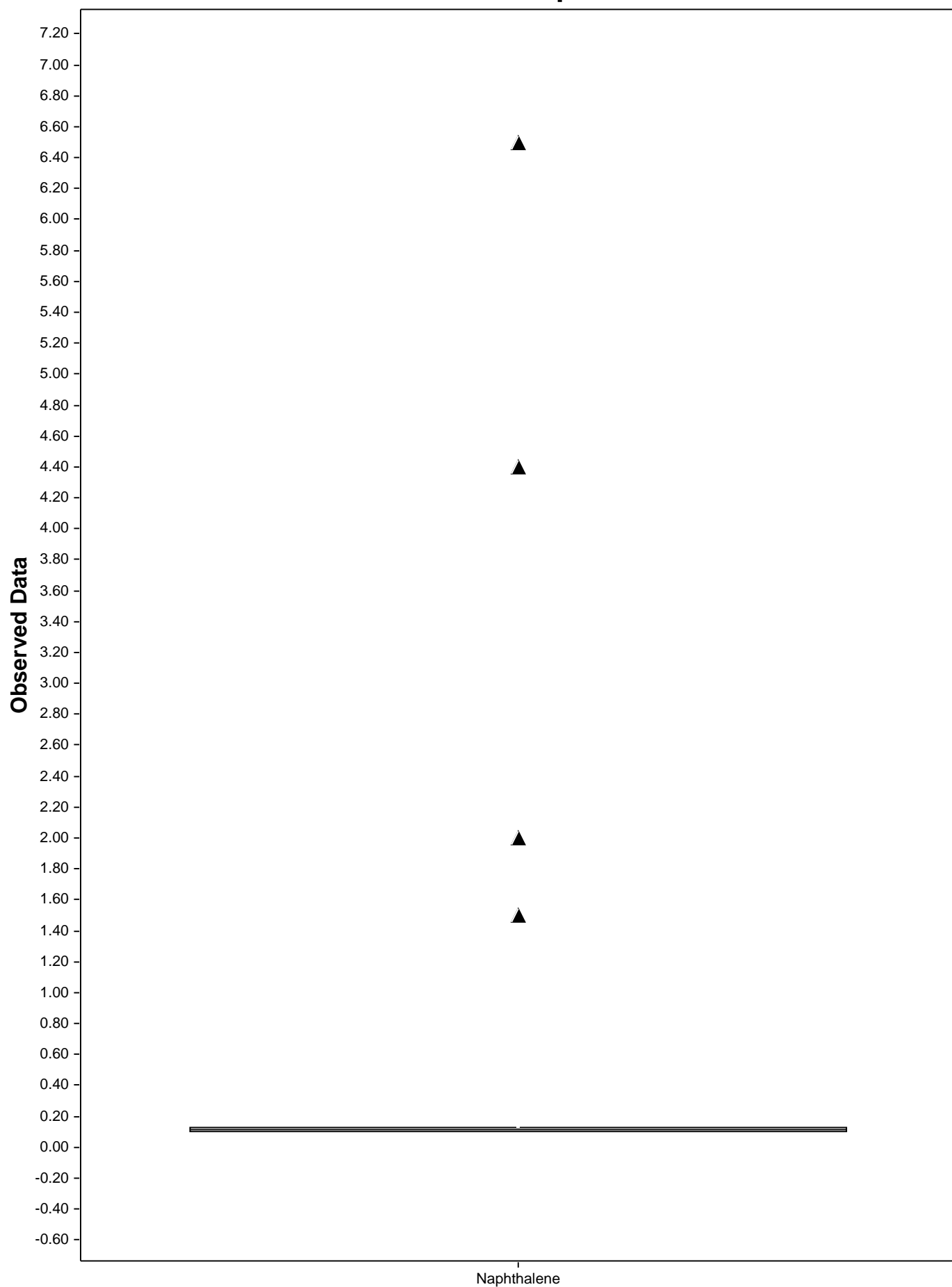
Box Plot for Methylcyclohexane



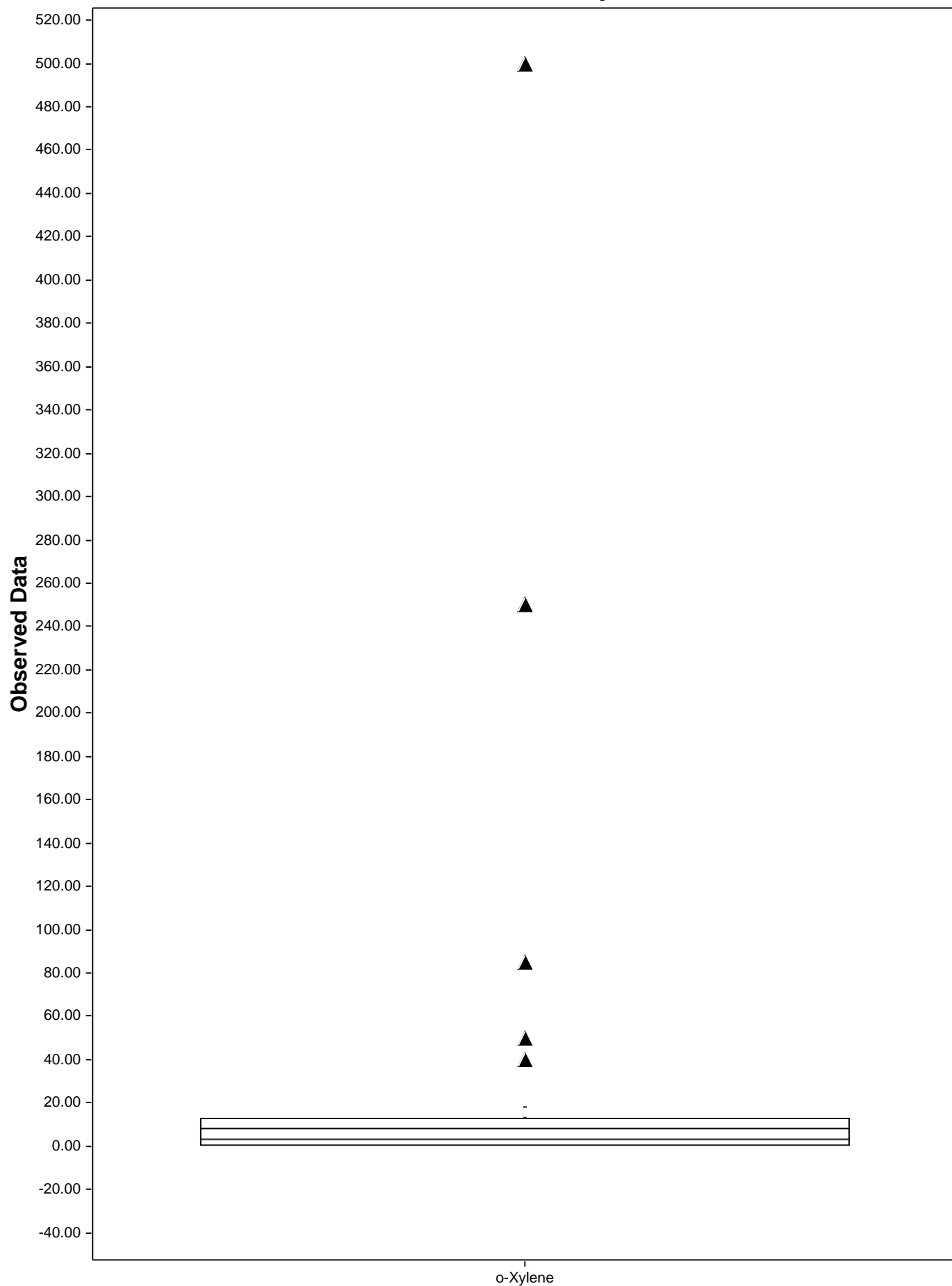
Box Plot for Methylene chloride



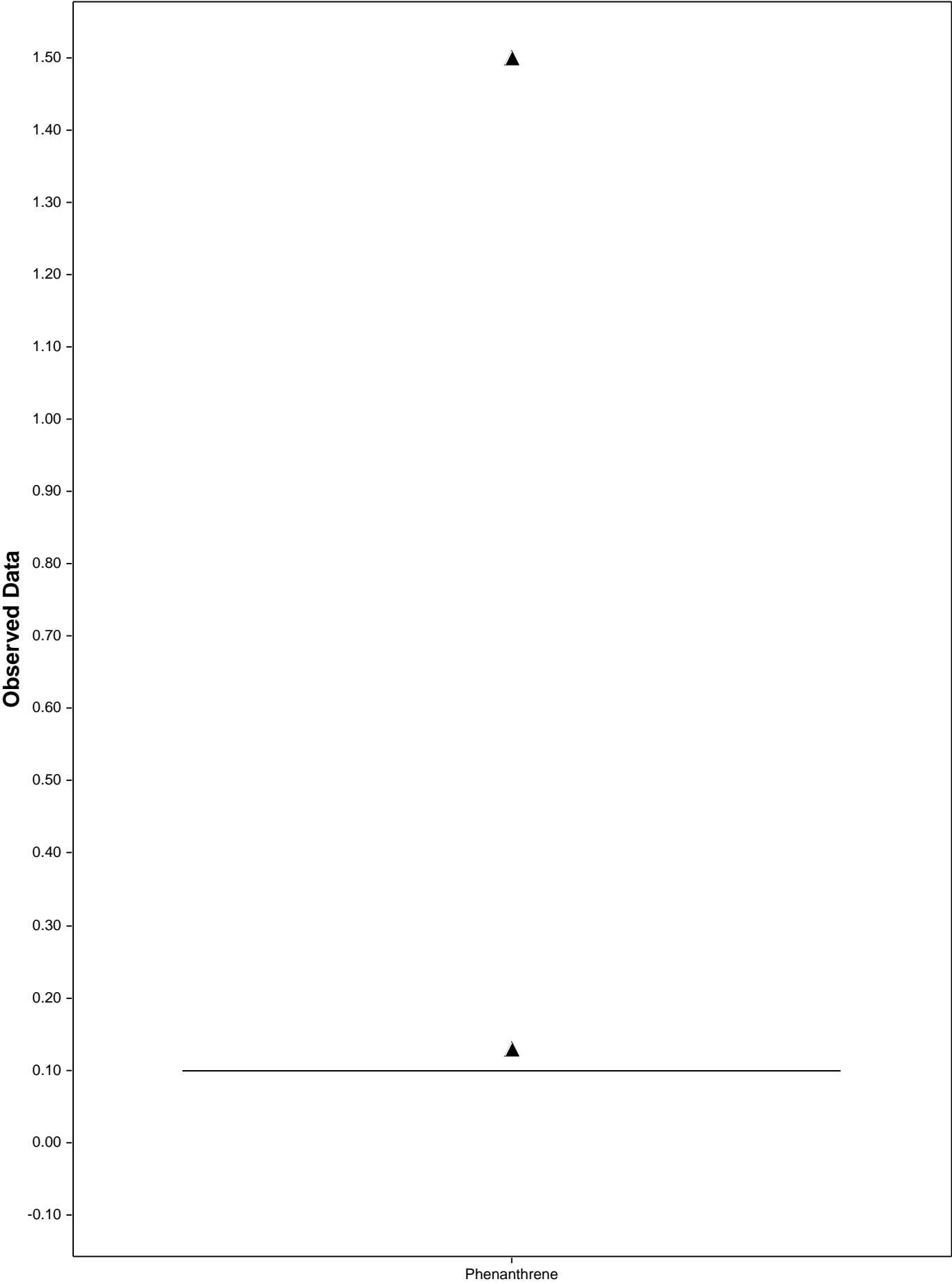
Box Plot for Naphthalene



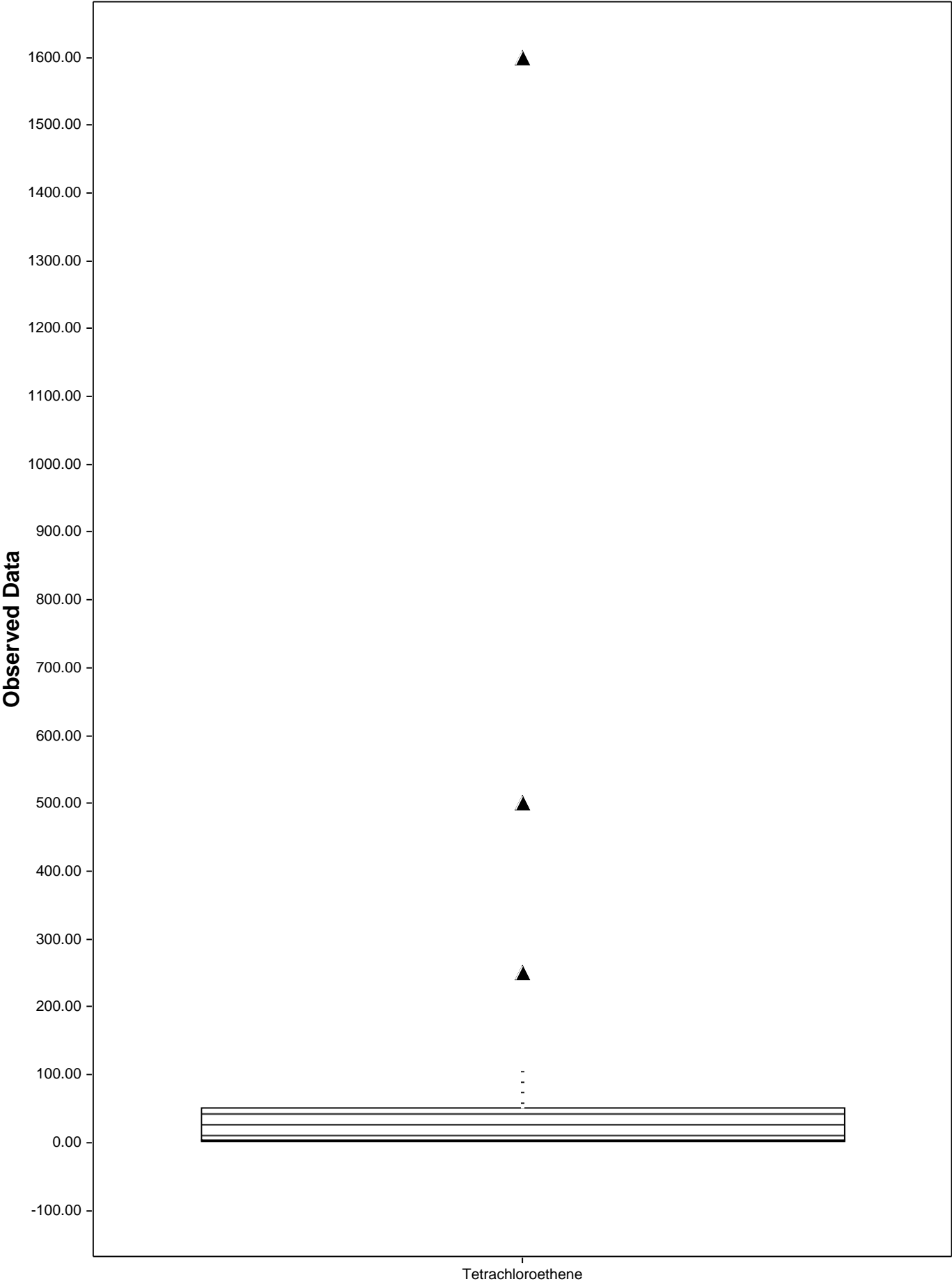
Box Plot for o-Xylene



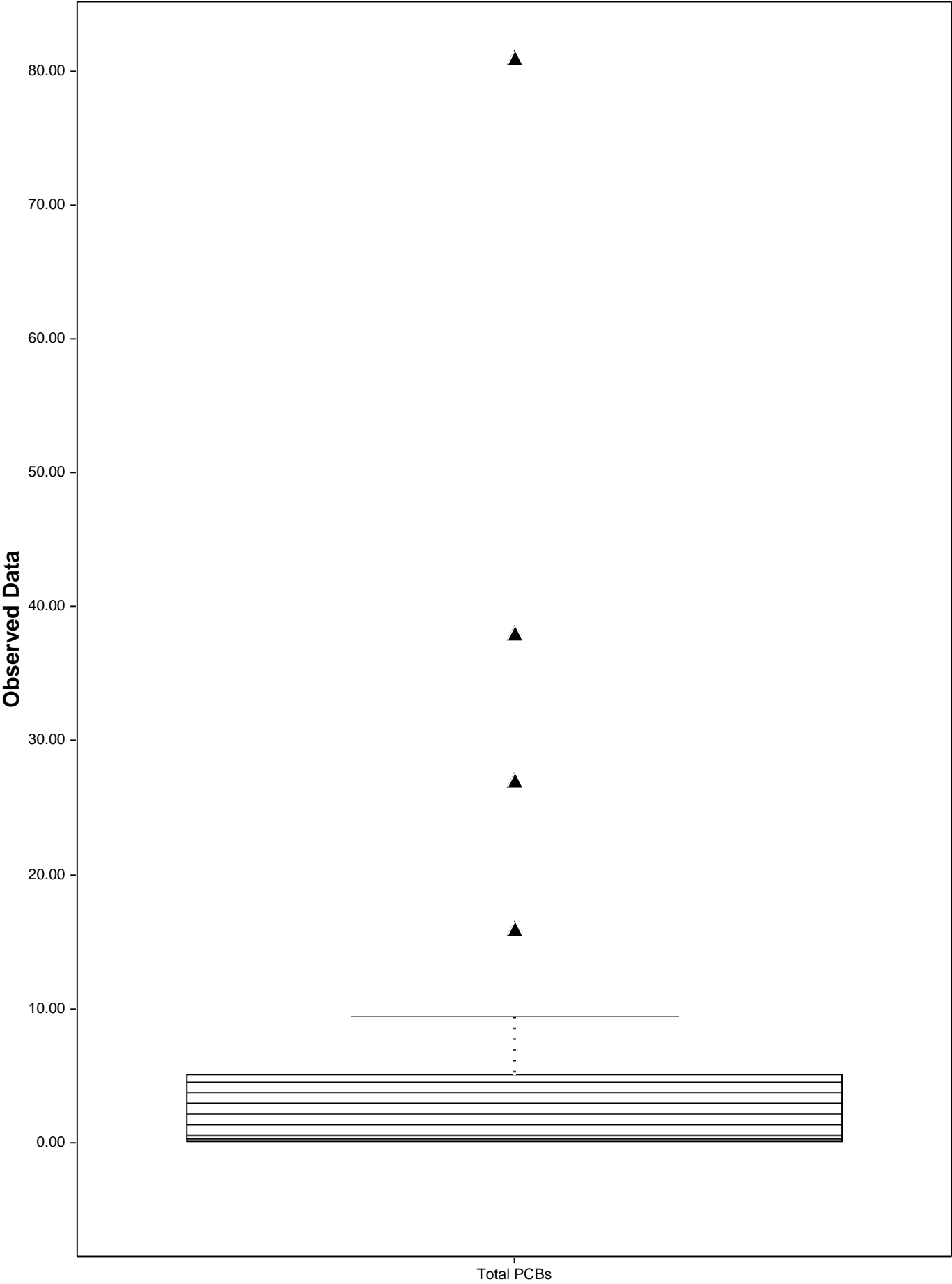
Box Plot for Phenanthrene



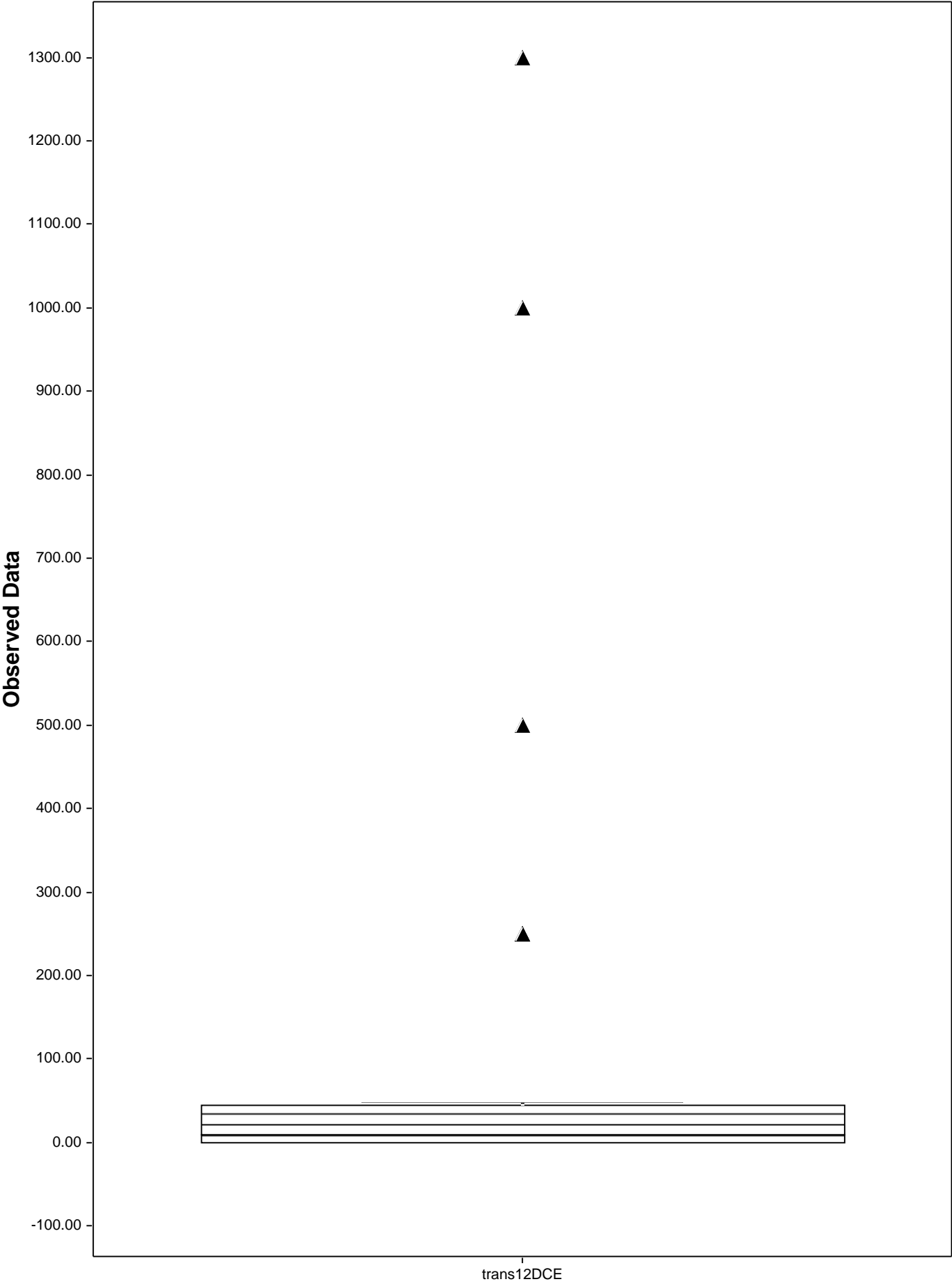
Box Plot for Tetrachloroethene



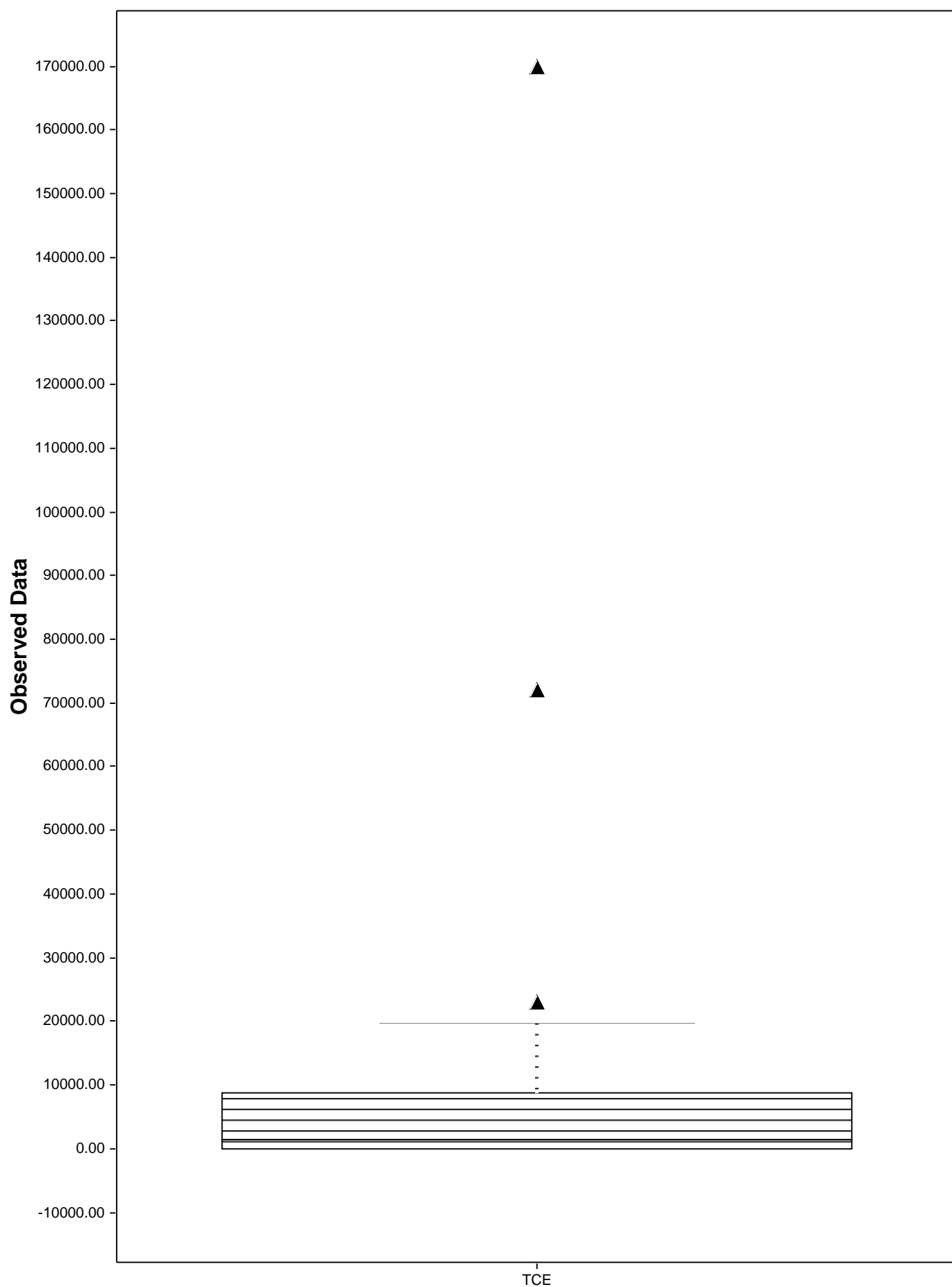
Box Plot for Total PCBs



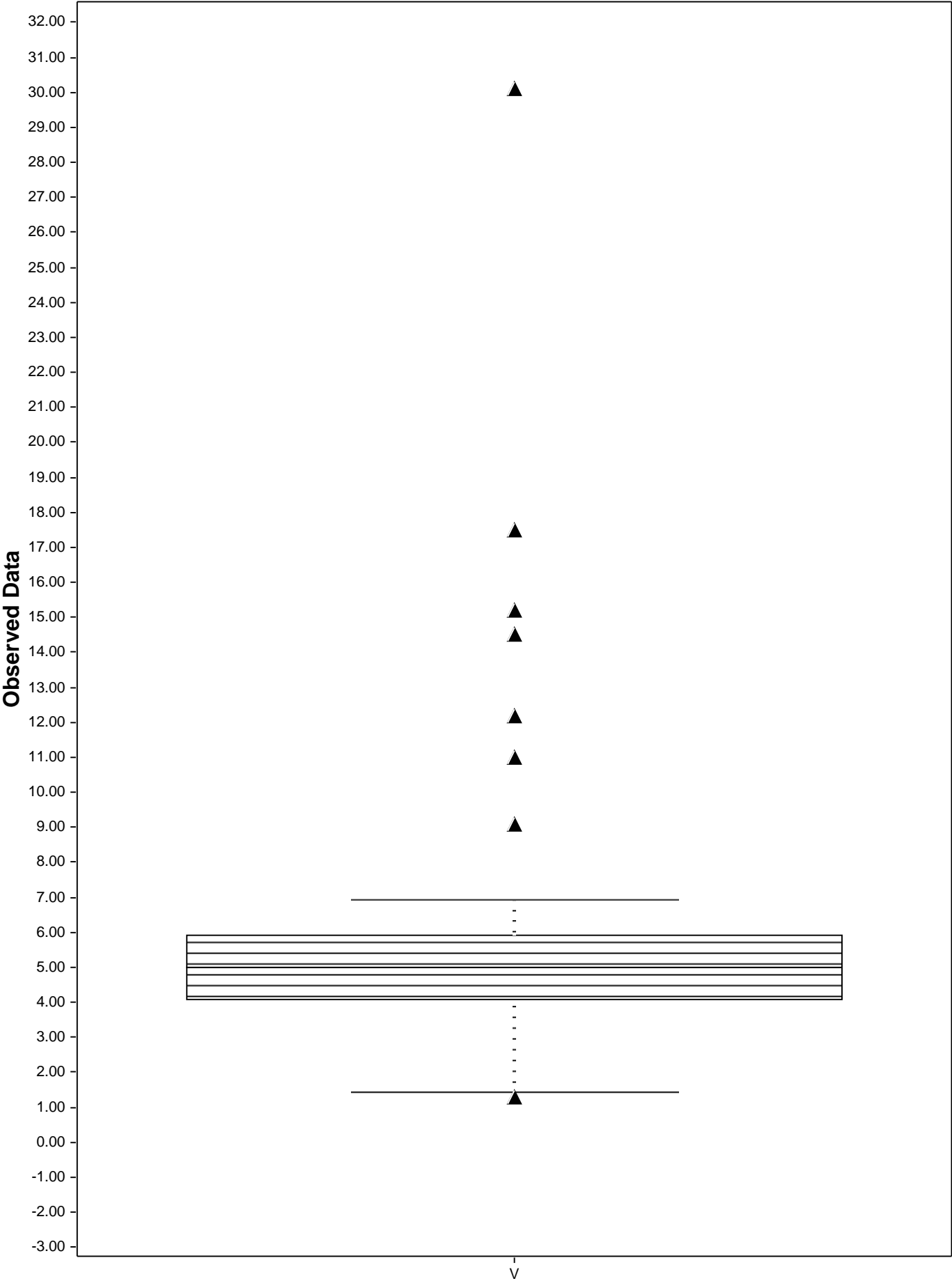
Box Plot for trans12DCE



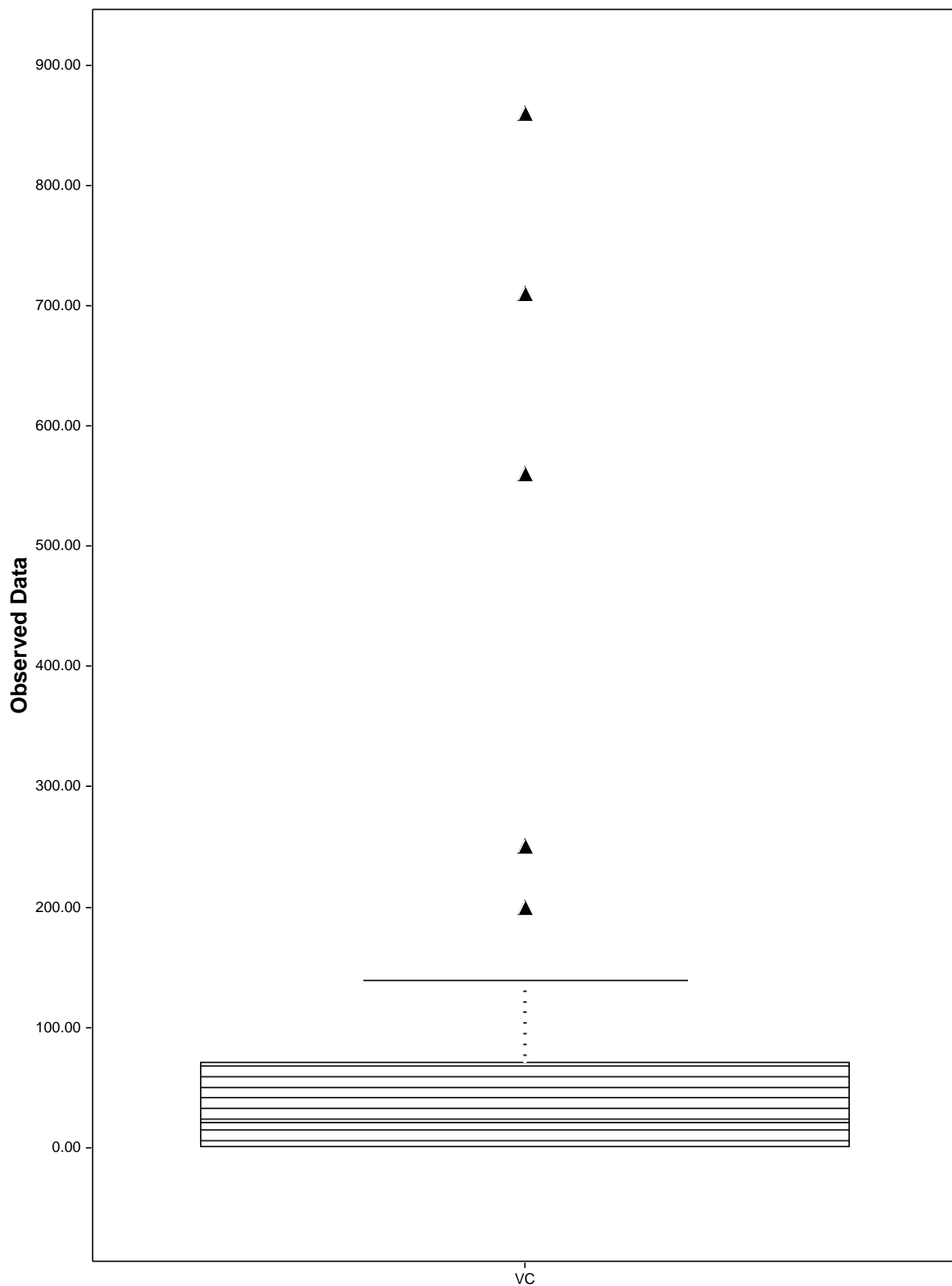
Box Plot for TCE



Box Plot for V



Box Plot for VC



APPENDIX E

Exposure Assessment Modeling Equations and Assumptions

APPENDIX E

Exposure Assessment Modeling Equations and Assumptions

- **Volatile Chemical Release to Air from Process/Industrial Uses of Groundwater**
- **Volatile Chemical Release to Outdoor Air during Construction/Utility Work**
- **Volatile Chemical Release to Indoor Air during Showering**
- **Dermal Exposure Assessment Worksheets**
- **RAGS D IEUBK Lead Worksheet**

VOLATILE CHEMICAL RELEASE TO AIR FROM PROCESS / INDUSTRIAL USES OF GROUNDWATER

The methodology to evaluate the potential exposure of commercial/industrial workers to volatile COPCs in groundwater is described below.

A modified version of “the Schaum model” (Schaum et al., 1992) was used to estimate concentrations of volatile COPCs in building air during and after the use of groundwater for process/industrial activities (e.g., to wash vehicles or equipment). The Schaum model was developed to estimate concentrations of volatile chemicals in bathroom air during and after showering. This model, however, can be modified to estimate concentrations of volatile chemicals in other types of spaces. As the model essentially addresses the spraying of water (showering) and subsequent release and dispersion of volatile chemicals in a confined space (bathroom), it can be modified for other types of water spraying scenarios.

The Schaum model was modified for this exposure assessment by assuming a truck washing scenario, as follows. A truck with dimensions of 75 feet long by 10 feet wide by 14 feet high is washed using a pressure washer (using 4 gallons of water per minute) in a one-story building of appropriate dimensions (100 feet long by 20 feet wide by 20 feet high). It was further assumed that 1 hour is required to clean each truck [with the time over which spraying occurs (t_1) equal to 0.5 hours and the time after spraying (t_2) equal to 0.5 hours], that the air in the building is completely exchanged between truck washing cycles, and that eight trucks are cleaned in a typical work day.

The Schaum model is a realistic yet simple model that treats the building as one compartment and yields air concentrations averaged over the time of the actual spraying and the time spent in the building subsequent to the spraying. It was assumed that the chemicals volatilize at a constant rate, instantly mix uniformly with the building air, and that ventilation with clean air does not occur within a given wash cycle. This implies that the chemical concentrations in air increase linearly from zero to a maximum at the end of the spraying and then remain constant during the time an individual spends in the building immediately after the spraying.

The average concentration of a volatile chemical in the building air over a period of t_s hours (for $t_s > 0$) was estimated from the following equation:

$$C_a = \frac{\left(\frac{C_{a,\max}}{2} \times t_1 \right) + (C_{a,\max} \times t_2)}{(t_1 + t_2)}$$

where:

- C_a = The concentration of a volatile chemical in the building air over a duration of t_s hours, mg/m^3
 $C_{a,\text{max}}$ = The maximum concentration of a volatile chemical in the building air, mg/m^3
 t_1 = The time over which spraying occurs, hr
 t_2 = The time after spraying, hr
 t_s = The time in the building during (t_1) and after (t_2) the spraying, hr

and where:

$$C_{a,\text{max}} = \frac{C_w \times f \times F_w \times t_1}{V_a}$$

where:

- C_w = The water concentration, mg/L
 f = The fraction volatilized, unitless
 F_w = The water flow rate, $908 \text{ L}/\text{hr}$
 V_a = The building volume, $1,133 \text{ m}^3$

The fraction volatilized is the mass fraction of the chemical in water that volatilizes over the course of the spraying and is a chemical-specific value that is not easily predicted. The volatilization rates depend on properties such as Henry's Law constant and molecular weight. Volatilization fractions ranging from 0.5 to 0.9 have been reported in studies using trichloroethene and chloroform. This range is assumed to be representative of all other volatile chemicals with Henry's Law constants that are similar or greater. Consistent with USEPA Region 2 guidance, for all volatile COPCs (regardless of their Henry's Law Constants), a volatilization fraction of 0.9 was used to model reasonable maximum exposure (RME), and a volatilization fraction of 0.5 was used under the central tendency exposure (CTE) scenario.

The Schaum model and resultant building air concentrations used to evaluate commercial/industrial worker exposure to volatile COPCs in groundwater are presented in **Table E-1**.

REFERENCES

- Schaum, J., K. Hoang, R. Kinerson, and J. Moya. 1992. Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water. California Environmental Protection Agency. Sacramento, CA.

VOLATILE CHEMICAL RELEASE FROM GROUNDWATER TO OUTDOOR AIR DURING CONSTRUCTION/UTILITY WORK

The methodology to evaluate the potential exposure of construction/utility workers to volatile COPCs in shallow groundwater is described below.

The depth to groundwater varies seasonally, and in some portions of the Site at certain times of the year, the water table may be only a few feet below ground surface (see Table 4-2 in the Remedial Investigation Report). Emissions of the volatile COPCs in groundwater were estimated under the assumption that shallow groundwater infiltrates a completed excavation for underground utility maintenance or repair, and volatile COPCs are released from pooled water at the bottom of the excavation. The exposure modeling required determination of COPC emission fluxes and concentrations in outdoor air above the excavation.

The following calculations and resultant outdoor air concentrations used to evaluate construction/utility worker exposure to volatile COPCs in shallow groundwater are presented in **Table E-2** (for shallow onsite groundwater), **Table E-3** (for shallow offsite groundwater, south of Bound Brook), and **Table E-4** (for shallow offsite groundwater, north of Bound Brook).

Emission Fluxes

The potential for volatile COPC emissions was evaluated based on the EPCs for those chemicals in groundwater, as presented in Appendix A, RAGS Part D Table 3.2, Table 3.3, and Table 3.4.

The following equation (USEPA, 1995a) was used to determine emission fluxes (in g/sec-m²) from pooled water at the bottom of the excavation:

$$F_i = K_i \times C_{Li} \times CF1$$

where:

F_i	= Maximum emission flux of chemical i, g/sec-m ²
K_i	= Overall mass transfer coefficient of chemical i, cm/sec
C_{Li}	= Liquid-phase concentration of chemical i, g/cm ³
$CF1$	= Conversion factor, 1E+04 cm ² /m ²

and where:

$$\frac{1}{K_i} = \left(\frac{1}{k_{i,L}} \right) + \left(\frac{R \times T_s}{H_i \times k_{i,G}} \right)$$

where:

$k_{i,L}$	= Liquid-phase mass transfer coefficient of chemical i, cm/sec
R	= Ideal gas constant, 8.2E-05 atm-m ³ /mole-K
T_s	= System temperature, 284 K
H_i	= Henry's Law constant of chemical i, atm-m ³ /mole
$k_{i,G}$	= Gas-phase mass transfer coefficient of constituent i, cm/sec

and where:

$$k_{i,L} = \left(\frac{MW_{O_2}}{MW_i} \right)^{0.5} \times \left(\frac{T_s}{298K} \right) \times k_{L,O_2}$$

where:

MW_{O_2}	= Molecular weight of oxygen, 32.0 g/mol
MW_i	= Molecular weight of constituent i, g/mol
T_s	= System temperature, 284 K
k_{L,O_2}	= Liquid-phase mass transfer coefficient of oxygen at 25°C, 0.002 cm/sec

and where:

$$k_{i,G} = \left(\frac{MW_{H_2O}}{MW_i} \right)^{0.335} \times \left(\frac{T_s}{298K} \right)^{1.005} \times k_{G,H_2O}$$

where:

MW_{H_2O}	= Molecular weight of water, 18.0 g/mol
k_{G,H_2O}	= Gas-phase mass transfer coefficient of water vapor at 25°C, 0.833 cm/sec

Outdoor Air Concentrations

Outdoor air concentrations of the volatile COPC emissions were determined using the USEPA-approved Point, Area and Line source (PAL2.1) model, version 89272 (USEPA, 1992), assuming that the excavation represents an area source of emissions. PAL2.1 has the capability of determining impacts above area sources, as well as downwind of a source. PAL2.1 is a multi-purpose model that can be used to estimate dispersion for point, area and line sources using Gaussian-plume steady-state assumptions. User-specified meteorological options allow for input of site-specific conditions that are representative of the site being modeled.

For this evaluation, it was assumed the excavated trench measures 1.5 m wide x 5.0 m long x 3.0 m deep. The pooled water surface was therefore modeled as a 1.5 m x 5.0 m flat area source. Nine receptors were used in the analysis. Eight receptors were placed along the edge of the excavation: one at each of the four corners, and one at the center of each side. In addition, one receptor was placed over the center of the excavation. All receptors were modeled at a height of 1.8 meters to simulate the height of a construction/utility worker.

The meteorological data consisted of an array of 54 meteorological conditions used in the USEPA-approved screening level model, SCREEN3 (USEPA, 1995b). These conditions represent 54 combinations of stability classes (1 to 6) and wind speeds (1 m/s to 20 m/s) that routinely occur in the atmosphere. The wind directions were set so that the wind blew directly toward each of the receptors. Model options selected for the analysis included a typical anemometer height of 6.1 meters, a mixing height of 5000 m, and an average temperature of 293 K. The wind was assumed to be constant below a height of 10 meters (as fixed by PAL2.1). Land use was classified as urban. The emission rate of the area source was set at 1 g/s-m². Output was then in the form of µg/m³ per g/s-m².

The modeling analysis predicted a maximum 1-hour average unitized impact of 1.30E-01 g/m³ per g/s-m². The maximum 1-hour average chemical concentrations (in mg/m³) in the outdoor air at the excavation ($C_{\text{outdoor,GW}}$) were calculated from the following equation:

$$C = \text{Maximum 1-hour average unitized impact} \times F_i \times CF2$$

where:

C	= Maximum 1-hour average chemical concentration in outdoor air, mg/m ³
F _i	= Emission flux, g/s-m ²
CF2	= Conversion factor, 1E-03 mg/µg

REFERENCES

- U.S. Environmental Protection Agency. 1995a. Guideline for Predictive Baseline Emissions Estimation for Superfund Sites. Interim Final. EPA-451/R-96-001. Air/Superfund National Technical Guidance Study Series. Office of Air Quality Planning and Standards, Research Triangle Park, NC. (November 1995).
- U.S. Environmental Protection Agency. 1995b. SCREEN3 Model and Users Guide. EPA-454/B-95-004. Research Triangle Park, NC.
- U.S. Environmental Protection Agency. 1992. PAL2.1: A Gaussian-Plume Algorithm for Point, Area, and Line Sources. Version 89272.

VOLATILE CHEMICAL RELEASE TO INDOOR AIR DURING SHOWERING

The concentrations of volatile COPCs in bathroom air during and after showering were estimated using an approach, "the Schaum model," recommended by the USEPA, Region 2. The Schaum model (Schaum et al., 1992) is a realistic yet simple model that treats the bathroom as one compartment and yields air concentrations averaged over the time of the actual shower and the time spent in the bathroom following the shower. It is assumed that chemicals volatilize at a constant rate, instantly mix uniformly with the bathroom air, and that ventilation with clean air does not occur. This implies that the chemical concentrations in the air increase linearly from zero to a maximum at the end of the shower and then remain constant during the time an individual spends in the bathroom immediately after the shower.

The average concentration of a volatile chemical in the shower air over a period of t_s hours (for $t_s > 0$) was estimated from the following equation:

$$C_a = \frac{\left(\frac{C_{a,\max}}{2} \times t_1 \right) + (C_{a,\max} \times t_2)}{(t_1 + t_2)}$$

where:

- C_a = The concentration of a volatile chemical in the bathroom air over a duration of t_s hours, mg/m^3
- $C_{a,\max}$ = The maximum concentration of a volatile chemical in the bathroom air, mg/m^3
- t_1 = The time of shower, hr
- t_2 = The time after shower, hr
- t_s = The time in the bathroom during (t_1) and after (t_2) the shower, hr

and where:

$$C_{a,\max} = \frac{C_w \times f \times F_w \times t_1}{V_a}$$

where:

- C_w = The water concentration, mg/L
- f = The fraction volatilized, unitless
- F_w = The water flow rate, 500 L/hr
- V_a = The bathroom volume, 16 m^3

The fraction volatilized is the mass fraction of the chemical in water that volatilizes over the course of the shower. The volatilization rates depend on

properties such as Henry's Law constant and molecular weight. Volatilization fractions ranging from 0.5 to 0.9 have been reported in studies using trichloroethene and chloroform. This range is assumed to be representative of all other volatile chemicals with Henry's Law constants which are similar or greater. Consistent with USEPA Region 2 guidance, for all volatile COPCs (regardless of their Henry's Law Constants), a volatilization fraction of 0.9 was used to model reasonable maximum exposure (RME), and a volatilization fraction of 0.5 was used under the central tendency exposure (CTE) scenario.

The Schaum model and resultant concentrations in shower/bathroom air are shown in **Table E-5** and **Table E-6** for resident adults and resident children, respectively.

REFERENCES

Schaum, J., K. Hoang, R. Kinerson, and J. Moya. 1992. Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water. California Environmental Protection Agency. Sacramento, CA.

TABLE E-1 (RME)
INDUSTRIAL/PROCESS USE SCENARIO - COMMERCIAL/INDUSTRIAL WORKER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm-m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Pressure Washer F_w (L/hr)	Time of t_1 (hours)	Time after t_2 (hours)	Bldg Room Volume V_a (m ³)	Max Concentration in Building Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	908	4	4	1,133	2.1E-03	1.6E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	908	4	4	1,133	1.2E-03	8.8E-01
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	908	4	4	1,133	1.1E-02	8.0E+00
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	908	4	4	1,133	8.0E-03	6.0E+00
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	908	4	4	1,133	9.9E-04	7.4E-01
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	908	4	4	1,133	6.2E-03	4.6E+00
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	908	4	4	1,133	1.5E-02	1.1E+01
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	908	4	4	1,133	1.4E-02	1.1E+01
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	908	4	4	1,133	2.0E-03	1.5E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	908	4	4	1,133	1.6E-03	1.2E+00
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	908	4	4	1,133	1.7E-02	1.2E+01
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	908	4	4	1,133	4.1E+01	3.1E+04
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	908	4	4	1,133	1.8E-01	1.3E+02
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	908	4	4	1,133	3.6E-02	2.7E+01
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	908	4	4	1,133	1.5E-03	1.1E+00
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	908	4	4	1,133	1.0E-01	7.8E+01
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	908	4	4	1,133	2.4E-02	1.8E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	908	4	4	1,133	1.7E-01	1.3E+02
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	908	4	4	1,133	1.1E-02	8.4E+00
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	908	4	4	1,133	2.0E+01	1.5E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	908	4	4	1,133	1.5E-01	1.2E+02
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	908	4	4	1,133	9.8E-04	7.4E-01

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

TABLE E-1 (CT)
INDUSTRIAL/PROCESS USE SCENARIO - COMMERCIAL/INDUSTRIAL WORKER
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm·m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Pressure Washer F_w (L/hr)	Time of t_1 (hours)	Time after t_2 (hours)	Bldg Room Volume V_a (m ³)	Max Concentration in Building Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	908	3	3	1,133	1.6E-03	1.2E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	908	3	3	1,133	8.8E-04	6.6E-01
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	908	3	3	1,133	8.0E-03	6.0E+00
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	908	3	3	1,133	6.0E-03	4.5E+00
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	908	3	3	1,133	7.4E-04	5.6E-01
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	908	3	3	1,133	4.6E-03	3.5E+00
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	908	3	3	1,133	1.1E-02	8.5E+00
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	908	3	3	1,133	1.1E-02	8.1E+00
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	908	3	3	1,133	1.5E-03	1.1E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	908	3	3	1,133	1.2E-03	9.0E-01
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	908	3	3	1,133	1.2E-02	9.3E+00
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	908	3	3	1,133	3.1E+01	2.3E+04
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	908	3	3	1,133	1.3E-01	9.9E+01
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	908	3	3	1,133	2.7E-02	2.0E+01
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	908	3	3	1,133	1.1E-03	8.2E-01
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	908	3	3	1,133	7.8E-02	5.8E+01
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	908	3	3	1,133	1.8E-02	1.4E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	908	3	3	1,133	1.3E-01	9.5E+01
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	908	3	3	1,133	8.4E-03	6.3E+00
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	908	3	3	1,133	1.5E+01	1.1E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	908	3	3	1,133	1.2E-01	8.6E+01
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	908	3	3	1,133	7.4E-04	5.5E-01

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

TABLE E-2
VOLATILE COPC EMISSION FLUX FROM SHALLOW ONSITE GROUNDWATER - CONSTRUCTION/UTILITY WORKER
CORNELL DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Objective: Determination of outdoor volatile chemical concentrations above a 1.5 m-wide x 5.0 m-long x 3.0 m-deep excavated trench, assuming shallow groundwater infiltrates and pools in the bottom of the excavation.

Chemical of Potential Concern	Groundwater Concentration $C_{i,GW}$ (mg/L)	Groundwater Concentration $C_{i,L}$ (g/cm ³)	Henry's Law Constant H (atm-m ³ /mole)	Molecular Weight MW_i (g/mol)	Liquid-Phase Mass Transfer Coefficient $k_{i,L}$ (cm/s)	Gas-Phase Mass Transfer Coefficient $k_{i,G}$ (cm/s)	Overall mass Transfer Coefficient K_i (cm/s)	Groundwater Emission Flux F_i (g/s-m ²)	Outdoor Air Concentration $C_{OUTDOOR, GROUNDWATER}$ (mg/m ³)
Benzene	3.0E-03	3.0E-09	5.6E-03	78	1.2E-03	4.9E-01	1.2E-03	3.6E-08	4.7E-06
Chlorobenzene	1.7E-02	1.7E-08	3.7E-03	154	8.7E-04	3.9E-01	8.6E-04	1.5E-07	1.9E-05
Chloroform	2.8E-03	2.8E-09	3.7E-03	119	9.9E-04	4.2E-01	9.7E-04	2.8E-08	3.6E-06
1,2-Dibromo-3-chloropropane	7.7E-05	7.7E-11	1.5E-04	236	7.0E-04	3.4E-01	5.3E-04	4.1E-10	5.3E-08
Dibromochloromethane	5.5E-04	5.5E-10	7.8E-04	208	7.5E-04	3.5E-01	7.0E-04	3.8E-09	5.0E-07
1,2-Dichlorobenzene	7.2E-03	7.2E-09	1.9E-03	147	8.9E-04	3.9E-01	8.7E-04	6.2E-08	8.1E-06
1,3-Dichlorobenzene	1.4E-02	1.4E-08	2.6E-03	147	8.9E-04	3.9E-01	8.7E-04	1.2E-07	1.6E-05
1,4-Dichlorobenzene	1.9E-02	1.9E-08	2.4E-03	147	8.9E-04	3.9E-01	8.7E-04	1.7E-07	2.2E-05
1,1-Dichloroethane	2.9E-03	2.9E-09	5.6E-03	99	1.1E-03	4.5E-01	1.1E-03	3.1E-08	4.1E-06
1,2-Dichloroethane	4.6E-03	4.6E-09	9.8E-04	99	1.1E-03	4.5E-01	1.0E-03	4.7E-08	6.1E-06
1,1-Dichloroethene	6.8E-02	6.8E-08	2.6E-02	97	1.1E-03	4.5E-01	1.1E-03	7.4E-07	9.7E-05
cis-1,2-Dichloroethene	1.4E+02	1.4E-04	4.1E-03	97	1.1E-03	4.5E-01	1.1E-03	1.5E-03	2.0E-01
trans-1,2-Dichloroethene	5.8E-01	5.8E-07	9.4E-03	97	1.1E-03	4.5E-01	1.1E-03	6.3E-06	8.2E-04
Ethylbenzene	1.1E-02	1.1E-08	7.9E-03	106	1.0E-03	4.4E-01	1.0E-03	1.1E-07	1.5E-05
Methylcyclohexane	5.9E-03	5.9E-09	4.3E+00	98	1.1E-03	4.5E-01	1.1E-03	6.4E-08	8.3E-06
Methylene chloride	7.0E-03	7.0E-09	2.2E-03	85	1.2E-03	4.7E-01	1.1E-03	8.0E-08	1.0E-05
Tetrachloroethene	5.4E-01	5.4E-07	1.8E-02	166	8.4E-04	3.8E-01	8.4E-04	4.5E-06	5.8E-04
1,2,3-Trichlorobenzene	7.4E-02	7.4E-08	1.2E-03	181	8.0E-04	3.7E-01	7.7E-04	5.7E-07	7.4E-05
1,2,4-Trichlorobenzene	1.8E-01	1.8E-07	1.4E-03	181	8.0E-04	3.7E-01	7.7E-04	1.4E-06	1.8E-04
1,1,2-Trichloroethane	1.4E-02	1.4E-08	9.1E-04	133	9.4E-04	4.1E-01	8.8E-04	1.2E-07	1.6E-05
Trichloroethene	2.3E+01	2.3E-05	1.0E-02	131	9.4E-04	4.1E-01	9.4E-04	2.2E-04	2.8E-02
o-Xylene	3.8E-02	3.8E-08	5.2E-03	106	1.0E-03	4.4E-01	1.0E-03	3.9E-07	5.1E-05
Vinyl chloride	1.6E-01	1.6E-07	2.7E-02	63	1.4E-03	5.2E-01	1.4E-03	2.2E-06	2.8E-04
Naphthalene	2.0E-03	2.0E-09	4.8E-04	128	9.5E-04	4.1E-01	8.6E-04	1.7E-08	2.2E-06
Phenanthrene	5.2E-04	5.2E-10	4.2E-05	178	8.1E-04	3.7E-01	3.7E-04	1.9E-09	2.5E-07

Note

Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

Parameter	Value	Source
(1) Maximum 1-hour unitized impact (g/m ³ per g/m ² s) =	1.30E-01	Predicted for urban land use
(2) Molecular weight of oxygen (MW_{O_2} , g/mol) =	32	Default
(3) System temperature (T_s , K) =	284	Default
(4) Liquid-phase mass transfer coefficient of oxygen at 25°C (k_{L,O_2} , cm/sec) =	0.002	Default
(5) Molecular weight of water (MW_{H_2O} , g/mol) =	18	Default
(6) Gas-phase mass transfer coefficient of water vapor at 25°C (k_G , H ₂ O, cm/sec) =	0.833	Default
(7) Ideal gas constant (R, atm-m ³ /mole-K) =	8.20E-05	Default

TABLE E-3
VOLATILE COPC EMISSION FLUX FROM SHALLOW OFFSITE GROUNDWATER, SOUTH OF BOUND BROOK - CONSTRUCTION/UTILITY WORKER
CORNELL DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Objective: Determination of outdoor volatile chemical concentrations above a 1.5 m-wide x 5.0 m-long x 3.0 m-deep excavated trench, assuming shallow groundwater infiltrates and pools in the bottom of the excavation.

Chemical of Potential Concern	Groundwater Concentration $C_{i, GW}$ (mg/L)	Groundwater Concentration C_{Li} (g/cm ³)	Henry's Law Constant H (atm-m ³ /mole)	Molecular Weight MW_i (g/mol)	Liquid-Phase Mass Transfer Coefficient $k_{i, L}$ (cm/s)	Gas-Phase Mass Transfer Coefficient $k_{i, G}$ (cm/s)	Overall mass Transfer Coefficient K_i (cm/s)	Groundwater Emission Flux F_i (g/s-m ²)	Outdoor Air Concentration $C_{OUTDOOR, GROUNDWATER}$ (mg/m ³)
Benzene	5.0E-04	5.0E-10	5.6E-03	78	1.2E-03	4.9E-01	1.2E-03	6.0E-09	7.9E-07
Chloroform	1.1E-03	1.1E-09	3.7E-03	119	9.9E-04	4.2E-01	9.7E-04	1.1E-08	1.4E-06
Dibromochloromethane	5.1E-04	5.1E-10	7.8E-04	208	7.5E-04	3.5E-01	7.0E-04	3.6E-09	4.7E-07
cis-1,2-Dichloroethene	1.7E-02	1.7E-08	4.1E-03	97	1.1E-03	4.5E-01	1.1E-03	1.8E-07	2.4E-05
Methyl tert-butyl ether	1.9E-01	1.9E-07	5.9E-04	78	1.2E-03	4.9E-01	1.1E-03	2.1E-06	2.7E-04
Tetrachloroethene	1.9E-03	1.9E-09	1.8E-02	166	8.4E-04	3.8E-01	8.4E-04	1.6E-08	2.1E-06
Trichloroethene	1.1E+00	1.1E-06	1.0E-02	131	9.4E-04	4.1E-01	9.4E-04	1.1E-05	1.4E-03
Naphthalene	1.3E-04	1.3E-10	4.8E-04	128	9.5E-04	4.1E-01	8.6E-04	1.1E-09	1.4E-07

Note
Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

Parameter	Value	Source
(1) Maximum 1-hour unitized impact (g/m ³ per g/m ² s) =	1.30E-01	Predicted for urban land use
(2) Molecular weight of oxygen (MW_{O_2} , g/mol) =	32	Default
(3) System temperature (T_s , K) =	284	Default
(4) Liquid-phase mass transfer coefficient of oxygen at 25°C (k_{L, O_2} , cm/sec) =	0.002	Default
(5) Molecular weight of water (MW_{H_2O} , g/mol) =	18	Default
(6) Gas-phase mass transfer coefficient of water vapor at 25°C (k_G , H ₂ O, cm/sec) =	0.833	Default
(7) Ideal gas constant (R, atm-m ³ /mole-K) =	8.20E-05	Default

TABLE E-4
VOLATILE COPC EMISSION FLUX FROM SHALLOW OFFSITE GROUNDWATER, NORTH OF BOUND BROOK - CONSTRUCTION/UTILITY WORKER
CORNELL DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Objective: Determination of outdoor volatile chemical concentrations above a 1.5 m-wide x 5.0 m-long x 3.0 m-deep excavated trench, assuming shallow groundwater infiltrates and pools in the bottom of the excavation.

Chemical of Potential Concern	Groundwater Concentration $C_{i,GW}$ (mg/L)	Groundwater Concentration C_{Li} (g/cm ³)	Henry's Law Constant H (atm-m ³ /mole)	Molecular Weight MW_i (g/mol)	Liquid-Phase Mass Transfer Coefficient $k_{i,L}$ (cm/s)	Gas-Phase Mass Transfer Coefficient $k_{i,G}$ (cm/s)	Overall mass Transfer Coefficient K_i (cm/s)	Groundwater Emission Flux F_i (g/s-m ²)	Outdoor Air Concentration $C_{OUTDOOR, GROUNDWATER}$ (mg/m ³)
Benzene	1.2E-03	1.2E-09	5.6E-03	78	1.2E-03	4.9E-01	1.2E-03	1.5E-08	1.9E-06
Bromodichloromethane	3.5E-04	3.5E-10	1.6E-03	164	8.4E-04	3.8E-01	8.2E-04	2.9E-09	3.7E-07
Chloroform	1.4E-03	1.4E-09	3.7E-03	119	9.9E-04	4.2E-01	9.7E-04	1.4E-08	1.8E-06
cis-1,2-Dichloroethene	4.9E-02	4.9E-08	4.1E-03	97	1.1E-03	4.5E-01	1.1E-03	5.3E-07	6.8E-05
Tetrachloroethene	3.8E-04	3.8E-10	1.8E-02	166	8.4E-04	3.8E-01	8.4E-04	3.1E-09	4.1E-07
Trichloroethene	2.4E-01	2.4E-07	1.0E-02	131	9.4E-04	4.1E-01	9.4E-04	2.2E-06	2.9E-04
Vinyl chloride	3.6E-04	3.6E-10	2.7E-02	63	1.4E-03	5.2E-01	1.4E-03	4.9E-09	6.4E-07
Naphthalene	1.1E-04	1.1E-10	4.8E-04	128	9.5E-04	4.1E-01	8.6E-04	9.7E-10	1.3E-07

Note
Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

Parameter	Value	Source
(1) Maximum 1-hour unitized impact (g/m ³ per g/m ² s) =	1.30E-01	Predicted for urban land use
(2) Molecular weight of oxygen (MW_{O_2} , g/mol) =	32	Default
(3) System temperature (T_s , K) =	284	Default
(4) Liquid-phase mass transfer coefficient of oxygen at 25°C (k_{L,O_2} , cm/sec) =	0.002	Default
(5) Molecular weight of water (MW_{H_2O} , g/mol) =	18	Default
(6) Gas-phase mass transfer coefficient of water vapor at 25°C (k_G , H ₂ O, cm/sec) =	0.833	Default
(7) Ideal gas constant (R, atm-m ³ /mole-K) =	8.20E-05	Default

TABLE E-5 (RME)
INDOOR SHOWER MODEL SCENARIO - ADULT RESIDENT
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm·m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Shower F_w (L/hr)	Time of Shower t_1 (hours)	Time after Shower t_2 (hours)	Bathroom Volume V_a (m ³)	Max Concentration in Bathroom Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	500	0.25	0.33	16	5.1E-03	4.0E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	500	0.25	0.33	16	2.9E-03	2.2E+00
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	500	0.25	0.33	16	2.6E-02	2.0E+01
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	500	0.25	0.33	16	2.0E-02	1.5E+01
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	500	0.25	0.33	16	2.4E-03	1.9E+00
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	500	0.25	0.33	16	1.5E-02	1.2E+01
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	500	0.25	0.33	16	3.7E-02	2.9E+01
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	500	0.25	0.33	16	3.5E-02	2.8E+01
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	500	0.25	0.33	16	4.9E-03	3.9E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	500	0.25	0.33	16	3.9E-03	3.1E+00
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	500	0.25	0.33	16	4.0E-02	3.2E+01
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	500	0.25	0.33	16	9.9E+01	7.8E+04
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	500	0.25	0.33	16	4.3E-01	3.4E+02
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	500	0.25	0.33	16	8.8E-02	6.9E+01
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	500	0.25	0.33	16	3.5E-03	2.8E+00
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	500	0.25	0.33	16	2.5E-01	2.0E+02
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	500	0.25	0.33	16	5.9E-02	4.7E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	500	0.25	0.33	16	4.1E-01	3.2E+02
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	500	0.25	0.33	16	2.7E-02	2.2E+01
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	500	0.25	0.33	16	5.0E+01	3.9E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	500	0.25	0.33	16	3.7E-01	2.9E+02
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	500	0.25	0.33	16	2.4E-03	1.9E+00

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

TABLE E-5 (CT)
INDOOR SHOWER MODEL SCENARIO - ADULT RESIDENT
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm-m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Shower F_w (L/hr)	Time of Shower t_1 (hours)	Time after Shower t_2 (hours)	Bathroom Volume V_a (m ³)	Max Concentration in Bathroom Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	500	0.11	0.14	16	2.2E-03	1.7E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	500	0.11	0.14	16	1.3E-03	9.8E-01
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	500	0.11	0.14	16	1.1E-02	8.9E+00
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	500	0.11	0.14	16	8.6E-03	6.7E+00
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	500	0.11	0.14	16	1.1E-03	8.3E-01
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	500	0.11	0.14	16	6.6E-03	5.2E+00
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	500	0.11	0.14	16	1.6E-02	1.3E+01
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	500	0.11	0.14	16	1.5E-02	1.2E+01
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	500	0.11	0.14	16	2.2E-03	1.7E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	500	0.11	0.14	16	1.7E-03	1.3E+00
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	500	0.11	0.14	16	1.8E-02	1.4E+01
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	500	0.11	0.14	16	4.4E+01	3.4E+04
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	500	0.11	0.14	16	1.9E-01	1.5E+02
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	500	0.11	0.14	16	3.9E-02	3.0E+01
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	500	0.11	0.14	16	1.6E-03	1.2E+00
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	500	0.11	0.14	16	1.1E-01	8.7E+01
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	500	0.11	0.14	16	2.6E-02	2.0E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	500	0.11	0.14	16	1.8E-01	1.4E+02
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	500	0.11	0.14	16	1.2E-02	9.4E+00
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	500	0.11	0.14	16	2.2E+01	1.7E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	500	0.11	0.14	16	1.6E-01	1.3E+02
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	500	0.11	0.14	16	1.1E-03	8.2E-01

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

TABLE E-6 (RME)
INDOOR SHOWER MODEL SCENARIO - CHILD RESIDENT
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm-m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Shower F_w (L/hr)	Time of Shower t_1 (hours)	Time after Shower t_2 (hours)	Bathroom Volume V_a (m ³)	Max Concentration in Bathroom Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	500	0.45	0.55	16	9.1E-03	7.1E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	500	0.45	0.55	16	5.1E-03	4.0E+00
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	500	0.45	0.55	16	4.7E-02	3.6E+01
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	500	0.45	0.55	16	3.5E-02	2.7E+01
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	500	0.45	0.55	16	4.3E-03	3.4E+00
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	500	0.45	0.55	16	2.7E-02	2.1E+01
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	500	0.45	0.55	16	6.6E-02	5.1E+01
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	500	0.45	0.55	16	6.3E-02	4.9E+01
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	500	0.45	0.55	16	8.8E-03	6.9E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	500	0.45	0.55	16	7.0E-03	5.4E+00
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	500	0.45	0.55	16	7.2E-02	5.6E+01
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	500	0.45	0.55	16	1.8E+02	1.4E+05
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	500	0.45	0.55	16	7.7E-01	6.0E+02
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	500	0.45	0.55	16	1.6E-01	1.2E+02
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	500	0.45	0.55	16	6.4E-03	4.9E+00
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	500	0.45	0.55	16	4.6E-01	3.5E+02
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	500	0.45	0.55	16	1.1E-01	8.3E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	500	0.45	0.55	16	7.4E-01	5.7E+02
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	500	0.45	0.55	16	4.9E-02	3.8E+01
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	500	0.45	0.55	16	8.9E+01	6.9E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	500	0.45	0.55	16	6.7E-01	5.2E+02
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	500	0.45	0.55	16	4.3E-03	3.3E+00

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

TABLE E-6 (CT)
INDOOR SHOWER MODEL SCENARIO - CHILD RESIDENT
CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
SOUTH PLAINFIELD, NEW JERSEY

Chemical	Concentration in Water C_w (mg/L)	Henry's Law Constant H (unitless)	Henry's Law Constant H (atm-m ³ /mol)	Diffusion Coefficient in Water D_w (m ² /sec)	Diffusion Coefficient in Air D_a (m ² /sec)	Fraction Volatilized f (unitless)	Flow Rate of Shower F_w (L/hr)	Time of Shower t_1 (hours)	Time after Shower t_2 (hours)	Bathroom Volume V_a (m ³)	Max Concentration in Bathroom Air $C_{a,max}$ (mg/m ³)	Concentration in Air C_a (µg/m ³)
Benzene	7.2E-04	2.3E-01	5.6E-03	9.8E-06	8.8E-02	0.9	500	0.15	0.18	16	3.0E-03	2.4E+00
Bromodichloromethane	4.1E-04	6.6E-02	1.6E-03	1.1E-05	3.0E-02	0.9	500	0.15	0.18	16	1.7E-03	1.3E+00
Chlorobenzene	3.7E-03	1.5E-01	3.7E-03	8.7E-06	7.3E-02	0.9	500	0.15	0.18	16	1.6E-02	1.2E+01
Chloroform	2.8E-03	1.5E-01	3.7E-03	1.0E-05	1.0E-01	0.9	500	0.15	0.18	16	1.2E-02	9.1E+00
Dibromochloromethane	3.4E-04	3.2E-02	7.8E-04	1.1E-05	2.0E-02	0.9	500	0.15	0.18	16	1.4E-03	1.1E+00
1,2-Dichlorobenzene	2.1E-03	7.8E-02	1.9E-03	7.9E-06	6.9E-02	0.9	500	0.15	0.18	16	9.1E-03	7.0E+00
1,3-Dichlorobenzene	5.2E-03	1.1E-01	2.6E-03	7.9E-06	6.9E-02	0.9	500	0.15	0.18	16	2.2E-02	1.7E+01
1,4-Dichlorobenzene	5.0E-03	1.0E-01	2.4E-03	7.9E-06	6.9E-02	0.9	500	0.15	0.18	16	2.1E-02	1.6E+01
1,1-Dichloroethane	7.0E-04	2.3E-01	5.6E-03	1.1E-05	7.4E-02	0.9	500	0.15	0.18	16	2.9E-03	2.3E+00
1,2-Dichloroethane	5.6E-04	4.0E-02	9.8E-04	9.9E-06	1.0E-01	0.9	500	0.15	0.18	16	2.3E-03	1.8E+00
1,1-Dichloroethene	5.7E-03	1.1E+00	2.6E-02	1.0E-05	9.0E-02	0.9	500	0.15	0.18	16	2.4E-02	1.9E+01
cis-1,2-Dichloroethene	1.4E+01	1.7E-01	4.1E-03	1.1E-05	7.4E-02	0.9	500	0.15	0.18	16	6.0E+01	4.6E+04
trans-1,2-Dichloroethene	6.1E-02	3.9E-01	9.4E-03	1.2E-05	7.1E-02	0.9	500	0.15	0.18	16	2.6E-01	2.0E+02
Methyl tert-butyl ether	1.3E-02	2.4E-02	5.9E-04	8.6E-06	7.5E-02	0.9	500	0.15	0.18	16	5.3E-02	4.1E+01
Methylene chloride	5.0E-04	9.0E-02	2.2E-03	1.2E-05	1.0E-01	0.9	500	0.15	0.18	16	2.1E-03	1.6E+00
Tetrachloroethene	3.6E-02	7.5E-01	1.8E-02	8.2E-06	7.2E-02	0.9	500	0.15	0.18	16	1.5E-01	1.2E+02
1,2,3-Trichlorobenzene	8.5E-03	5.1E-02	1.2E-03	8.4E-06	4.0E-02	0.9	500	0.15	0.18	16	3.6E-02	2.8E+01
1,2,4-Trichlorobenzene	5.8E-02	5.8E-02	1.4E-03	8.2E-06	3.0E-02	0.9	500	0.15	0.18	16	2.5E-01	1.9E+02
1,1,2-Trichloroethane	3.9E-03	3.7E-02	9.1E-04	8.8E-06	7.8E-02	0.9	500	0.15	0.18	16	1.6E-02	1.3E+01
Trichloroethene	7.0E+00	4.2E-01	1.0E-02	9.1E-06	7.9E-02	0.9	500	0.15	0.18	16	3.0E+01	2.3E+04
Vinyl chloride	5.3E-02	1.1E+00	2.7E-02	1.2E-06	1.1E-01	0.9	500	0.15	0.18	16	2.2E-01	1.7E+02
Naphthalene	3.4E-04	2.0E-02	4.8E-04	7.5E-06	5.9E-02	0.9	500	0.15	0.18	16	1.4E-03	1.1E+00

Note: Sources of chemical-specific properties (i.e., Henry's Law Constant, etc.) are USEPA (1996b) and USDOE (2011).

Dermal Exposure Assessment Worksheets

Table E-7
Dermal Worksheet
Intermediate Variables for Calculating DA_{event}

Scenario Timeframe:	Current/Future
Receptor Population:	Commercial/Industrial Worker
Exposure Medium:	Groundwater, Entire Aquifer

Chemical of Potential Concern	FA	Kp		t-event		Tau (event)		t*		B
	Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Benzene	1	1.5E-02	cm/hr	8	hr/event	0.29	hr/event	0.70	hr	0.051
Bromodichloromethane	1	4.6E-03	cm/hr	8	hr/event	0.88	hr/event	2.12	hr	0.023
Chlorobenzene	0.7	2.8E-02	cm/hr	8	hr/event	0.46	hr/event	1.09	hr	0.115
Chloroform	1	6.8E-03	cm/hr	8	hr/event	0.50	hr/event	1.19	hr	0.029
Dibromochloromethane	1	3.2E-03	cm/hr	8	hr/event	1.57	hr/event	3.77	hr	0.018
1,2-Dichlorobenzene	1	4.1E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.193
1,3-Dichlorobenzene	1	5.8E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.270
1,4-Dichlorobenzene	1	4.2E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.196
1,1-Dichloroethane	1	6.7E-03	cm/hr	8	hr/event	0.38	hr/event	0.92	hr	0.026
1,2-Dichloroethane	1	4.2E-03	cm/hr	8	hr/event	0.38	hr/event	0.92	hr	0.016
1,1-Dichloroethene	1	1.2E-02	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.044
cis-1,2-Dichloroethene	1	7.7E-03	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.029
trans-1,2-Dichloroethene	1	7.7E-03	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.029
Methyl tert-butyl ether	1	2.1E-03	cm/hr	8	hr/event	0.33	hr/event	0.80	hr	0.008
Methylene chloride	1	3.5E-03	cm/hr	8	hr/event	0.32	hr/event	0.76	hr	0.013
Tetrachloroethene	1	3.3E-02	cm/hr	8	hr/event	0.91	hr/event	2.18	hr	0.166
1,2,3-Trichlorobenzene	1	7.4E-02	cm/hr	8	hr/event	1.10	hr/event	2.65	hr	0.384
1,2,4-Trichlorobenzene	1	6.6E-02	cm/hr	8	hr/event	1.11	hr/event	2.66	hr	0.343
1,1,2-Trichloroethane	1	6.4E-03	cm/hr	8	hr/event	0.60	hr/event	1.43	hr	0.029
Trichloroethene	1	1.2E-02	cm/hr	8	hr/event	0.58	hr/event	1.39	hr	0.051
Vinyl chloride	1	5.6E-03	cm/hr	8	hr/event	0.24	hr/event	0.57	hr	0.017
bis(2-Ethylhexyl)phthalate	0.8	2.5E-02	cm/hr	8	hr/event	16.64	hr/event	39.93	hr	0.190
Dibenzo(a,h)anthracene	0.6	1.5E+00	cm/hr	8	hr/event	3.88	hr/event	17.57	hr	9.677
Indeno(1,2,3-cd)pyrene	0.6	1.0E+00	cm/hr	8	hr/event	3.78	hr/event	16.83	hr	6.654
Naphthalene	1	4.7E-02	cm/hr	8	hr/event	0.56	hr/event	1.34	hr	0.203
Total PCB Aroclors (as Aroclor 1254)	0.5	7.6E-01	cm/hr	8	hr/event	7.18	hr/event	31.57	hr	5.244
alpha-BHC	0.9	1.2E-02	cm/hr	8	hr/event	4.57	hr/event	10.97	hr	0.080
gamma-Chlordane	0.7	3.8E-02	cm/hr	8	hr/event	21.21	hr/event	50.91	hr	0.294
4,4'-DDD	0.8	1.8E-01	cm/hr	8	hr/event	6.65	hr/event	25.99	hr	1.234
4,4'-DDE	0.8	1.6E-01	cm/hr	8	hr/event	6.48	hr/event	25.08	hr	1.067
4,4'-DDT	0.7	2.7E-01	cm/hr	8	hr/event	10.45	hr/event	42.51	hr	1.948
Heptachlor	0.8	8.6E-03	cm/hr	8	hr/event	13.27	hr/event	31.85	hr	0.064
2,3,7,8-TCDD Toxic Equivalence	0.5	8.1E-01	cm/hr	8	hr/event	6.82	hr/event	30.09	hr	5.573
Aluminum	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Arsenic	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Barium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Cadmium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Chromium (Cr VI)	1	2.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Cobalt	1	4.0E-04	cm/hr	8	hr/event	--	hr/event	--	hr	--
Iron	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Manganese	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Vanadium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--

Notes

FA = Fraction Absorbed Water; default value = 1 (USEPA, 2004)

Kp = Dermal Permeability Coefficient of chemical in water (USEPA, 1996b and USDOE, 2011)

T(event) = Event Duration

Tau = Lag Time

t* = Time to Reach Steady-State

B = Dimensionless Ratio of the Permeability Coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis

Table E-8
Dermal Worksheet
Intermediate Variables for Calculating DA_{event}

Scenario Timeframe:	Current/Future
Receptor Population:	Construction/Utility Worker
Exposure Medium:	Shallow Groundwater

Chemical of Potential Concern	FA	Kp		t-event		tau (event)		t*		B
	Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Benzene	1	1.5E-02	cm/hr	8	hr/event	0.29	hr/event	0.70	hr	0.051
Bromodichloromethane	1	4.6E-03	cm/hr	8	hr/event	0.88	hr/event	2.12	hr	0.023
Chlorobenzene	0.7	2.8E-02	cm/hr	8	hr/event	0.46	hr/event	1.09	hr	0.115
Chloroform	1	6.8E-03	cm/hr	8	hr/event	0.50	hr/event	1.19	hr	0.029
1,2-Dibromo-3-chloropropane	1	6.9E-03	cm/hr	8	hr/event	2.25	hr/event	5.39	hr	0.041
Dibromochloromethane	1	3.2E-03	cm/hr	8	hr/event	1.57	hr/event	3.77	hr	0.018
1,2-Dichlorobenzene	1	4.1E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.193
1,3-Dichlorobenzene	1	5.8E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.270
1,4-Dichlorobenzene	1	4.2E-02	cm/hr	8	hr/event	0.71	hr/event	1.71	hr	0.196
1,1-Dichloroethane	1	6.7E-03	cm/hr	8	hr/event	0.38	hr/event	0.92	hr	0.026
1,2-Dichloroethane	1	4.2E-03	cm/hr	8	hr/event	0.38	hr/event	0.92	hr	0.016
1,1-Dichloroethene	1	1.2E-02	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.044
cis-1,2-Dichloroethene	1	7.7E-03	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.029
trans-1,2-Dichloroethene	1	7.7E-03	cm/hr	8	hr/event	0.37	hr/event	0.89	hr	0.029
Ethylbenzene	1	4.9E-02	cm/hr	8	hr/event	0.42	hr/event	1.01	hr	0.195
Methyl tert-butyl ether	1	2.1E-03	cm/hr	8	hr/event	0.33	hr/event	0.80	hr	0.008
Methylcyclohexane	1	2.1E-03	cm/hr	8	hr/event	0.38	hr/event	0.91	hr	0.421
Methylene chloride	1	3.5E-03	cm/hr	8	hr/event	0.32	hr/event	0.76	hr	0.013
Tetrachloroethene	1	3.3E-02	cm/hr	8	hr/event	0.91	hr/event	2.18	hr	0.166
1,2,3-Trichlorobenzene	1	7.4E-02	cm/hr	8	hr/event	1.10	hr/event	2.65	hr	0.384
1,2,4-Trichlorobenzene	1	6.6E-02	cm/hr	8	hr/event	1.11	hr/event	2.66	hr	0.343
1,1,2-Trichloroethane	1	6.4E-03	cm/hr	8	hr/event	0.60	hr/event	1.43	hr	0.029
Trichloroethene	1	1.2E-02	cm/hr	8	hr/event	0.58	hr/event	1.39	hr	0.051
o-Xylene	1	4.8E-02	cm/hr	8	hr/event	0.42	hr/event	1.01	hr	0.189
Vinyl chloride	1	5.6E-03	cm/hr	8	hr/event	0.24	hr/event	0.57	hr	0.017
Benzo(a)anthracene	1	4.7E-01	cm/hr	8	hr/event	2.03	hr/event	8.53	hr	2.752
Benzo(a)pyrene	1	7.0E-01	cm/hr	8	hr/event	2.69	hr/event	11.67	hr	4.265
Benzo(b)fluoranthene	1	7.0E-01	cm/hr	8	hr/event	2.77	hr/event	12.03	hr	4.289
Benzo(g,h,i)perylene	1	1.1E+00	cm/hr	8	hr/event	3.77	hr/event	16.83	hr	7.207
Benzo(k)fluoranthene	1	6.9E-01	cm/hr	8	hr/event	2.76	hr/event	11.97	hr	4.238
1,1-Biphenyl	1	9.4E-02	cm/hr	8	hr/event	0.78	hr/event	1.87	hr	0.450
Bis(2-ethylhexyl)phthalate	0.8	2.5E-02	cm/hr	8	hr/event	16.64	hr/event	39.93	hr	0.190
Dibenzo(a,h)anthracene	0.6	1.5E+00	cm/hr	8	hr/event	3.88	hr/event	17.57	hr	9.677
Indeno(1,2,3-cd)pyrene	0.6	1.0E+00	cm/hr	8	hr/event	3.78	hr/event	16.83	hr	6.654
Naphthalene	1	4.7E-02	cm/hr	8	hr/event	0.56	hr/event	1.34	hr	0.203
Phenanthrene	1	1.4E-01	cm/hr	8	hr/event	1.06	hr/event	4.11	hr	0.740
Total PCB Aroclors (as Aroclor 1254)	0.5	7.6E-01	cm/hr	8	hr/event	7.18	hr/event	31.57	hr	5.244
alpha-BHC	0.9	1.2E-02	cm/hr	8	hr/event	4.57	hr/event	10.97	hr	0.080
beta-BHC	0.9	1.2E-02	cm/hr	8	hr/event	4.57	hr/event	10.97	hr	0.078
delta-BHC	0.9	2.1E-02	cm/hr	8	hr/event	4.57	hr/event	10.97	hr	0.135
gamma-BHC	0.9	1.1E-02	cm/hr	8	hr/event	4.57	hr/event	10.97	hr	0.071
gamma-Chlordane	0.7	3.8E-02	cm/hr	8	hr/event	21.21	hr/event	50.91	hr	0.294
4,4'-DDD	0.8	1.8E-01	cm/hr	8	hr/event	6.65	hr/event	25.99	hr	1.234
4,4'-DDE	0.8	1.8E-01	cm/hr	8	hr/event	6.48	hr/event	25.08	hr	1.067
4,4'-DDT	0.7	2.7E-01	cm/hr	8	hr/event	10.45	hr/event	42.51	hr	1.948
Dieldrin	0.8	1.2E-02	cm/hr	8	hr/event	14.62	hr/event	35.09	hr	0.092
Endosulfan II	1	2.9E-03	cm/hr	8	hr/event	20.46	hr/event	49.10	hr	0.022
Endosulfan sulfate	1	1.8E-03	cm/hr	8	hr/event	25.16	hr/event	60.38	hr	0.014
Endrin aldehyde	1	1.8E-02	cm/hr	8	hr/event	14.62	hr/event	35.09	hr	0.133
Heptachlor	0.8	8.6E-03	cm/hr	8	hr/event	13.27	hr/event	31.85	hr	0.064
2,3,7,8-TCDD Toxic Equivalence	0.5	8.1E-01	cm/hr	8	hr/event	6.82	hr/event	30.09	hr	5.573
Aluminum	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Antimony	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Arsenic	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Barium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Cadmium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Chromium (Cr VI)	1	2.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Cobalt	1	4.0E-04	cm/hr	8	hr/event	--	hr/event	--	hr	--
Iron	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Manganese	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--
Vanadium	1	1.0E-03	cm/hr	8	hr/event	--	hr/event	--	hr	--

Notes
FA = Fraction Absorbed Water; default value = 1 (USEPA, 2004)
Kp = Dermal Permeability Coefficient of chemical in water (USEPA, 1996b and USDOE, 2011)
T(event) = Event Duration
Tau = Lag Time
t* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis

Table E-9
Dermal Worksheet
Intermediate Variables for Calculating DA_{event}

Scenario Timeframe:	Current/Future
Receptor Population:	Resident Adult
Exposure Medium:	Groundwater, Entire Aquifer

Chemical of Potential Concern	FA	Kp		t-event		Tau (event)		t*		B
	Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Chlorobenzene	0.7	2.8E-02	cm/hr	0.25	hr/event	0.46	hr/event	1.09	hr	0.115
1,2-Dichlorobenzene	1	4.1E-02	cm/hr	0.25	hr/event	0.71	hr/event	1.71	hr	0.193
1,3-Dichlorobenzene	1	5.8E-02	cm/hr	0.25	hr/event	0.71	hr/event	1.71	hr	0.270
1,4-Dichlorobenzene	1	4.2E-02	cm/hr	0.25	hr/event	0.71	hr/event	1.71	hr	0.196
Tetrachloroethene	1	3.3E-02	cm/hr	0.25	hr/event	0.91	hr/event	2.18	hr	0.166
1,2,3-Trichlorobenzene	1	7.4E-02	cm/hr	0.25	hr/event	1.10	hr/event	2.65	hr	0.384
1,2,4-Trichlorobenzene	1	6.6E-02	cm/hr	0.25	hr/event	1.11	hr/event	2.66	hr	0.343
Trichloroethene	1	1.2E-02	cm/hr	0.25	hr/event	0.58	hr/event	1.39	hr	0.051
bis(2-Ethylhexyl)phthalate	0.8	2.5E-02	cm/hr	0.25	hr/event	16.64	hr/event	39.93	hr	0.190
Dibenzo(a,h)anthracene	0.6	1.5E+00	cm/hr	0.25	hr/event	3.88	hr/event	17.57	hr	9.677
Indeno(1,2,3-cd)pyrene	0.6	1.0E+00	cm/hr	0.25	hr/event	3.78	hr/event	16.83	hr	6.654
Naphthalene	1	4.7E-02	cm/hr	0.25	hr/event	0.56	hr/event	1.34	hr	0.203
Total PCB Aroclors (as Aroclor 1254)	0.5	7.6E-01	cm/hr	0.25	hr/event	7.18	hr/event	31.57	hr	5.244
alpha-BHC	0.9	1.2E-02	cm/hr	0.25	hr/event	4.57	hr/event	10.97	hr	0.080
gamma-Chlordane	0.7	3.8E-02	cm/hr	0.25	hr/event	21.21	hr/event	50.91	hr	0.294
4,4'-DDD	0.8	1.8E-01	cm/hr	0.25	hr/event	6.65	hr/event	25.99	hr	1.234
4,4'-DDE	0.8	1.6E-01	cm/hr	0.25	hr/event	6.48	hr/event	25.08	hr	1.067
4,4'-DDT	0.7	2.7E-01	cm/hr	0.25	hr/event	10.45	hr/event	42.51	hr	1.948
Heptachlor	0.8	8.6E-03	cm/hr	0.25	hr/event	13.27	hr/event	31.85	hr	0.064
2,3,7,8-TCDD Toxic Equivalence	0.5	8.1E-01	cm/hr	0.25	hr/event	6.82	hr/event	30.09	hr	5.573
Aluminum	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Arsenic	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Barium	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Cadmium	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Chromium	1	2.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Cobalt	1	4.0E-04	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Iron	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Manganese	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—
Vanadium	1	1.0E-03	cm/hr	0.25	hr/event	—	hr/event	—	hr	—

Notes

FA = Fraction Absorbed Water; default value = 1 (USEPA, 2004)
Kp = Dermal Permeability Coefficient of chemical in water (USEPA, 1996b and USDOE, 2011)
T(event) = Event Duration
Tau = Lag Time
T* = Time to Reach Steady-State
B = Dimensionless Ratio of the Permeability Coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis

Table E-10
Dermal Worksheet
Intermediate Variables for Calculating DA_{event}

Scenario Timeframe:	Current/Future
Receptor Population:	Resident Child
Exposure Medium:	Groundwater, Entire Aquifer

Chemical of Potential Concern	FA	Kp		t-event		Tau (event)		t*		B
	Value	Value	Units	Value	Units	Value	Units	Value	Units	Value
Chlorobenzene	0.7	2.8E-02	cm/hr	0.45	hr/event	0.46	hr/event	1.09	hr	0.115
1,2-Dichlorobenzene	1	4.1E-02	cm/hr	0.45	hr/event	0.71	hr/event	1.71	hr	0.193
1,3-Dichlorobenzene	1	5.8E-02	cm/hr	0.45	hr/event	0.71	hr/event	1.71	hr	0.270
1,4-Dichlorobenzene	1	4.2E-02	cm/hr	0.45	hr/event	0.71	hr/event	1.71	hr	0.196
Tetrachloroethene	1	3.3E-02	cm/hr	0.45	hr/event	0.91	hr/event	2.18	hr	0.166
1,2,3-Trichlorobenzene	1	7.4E-02	cm/hr	0.45	hr/event	1.10	hr/event	2.65	hr	0.384
1,2,4-Trichlorobenzene	1	6.6E-02	cm/hr	0.45	hr/event	1.11	hr/event	2.66	hr	0.343
Trichloroethene	1	1.2E-02	cm/hr	0.45	hr/event	0.58	hr/event	1.39	hr	0.051
bis(2-Ethylhexyl)phthalate	0.8	2.5E-02	cm/hr	0.45	hr/event	16.64	hr/event	39.93	hr	0.190
Dibenzo(a,h)anthracene	0.6	1.5E+00	cm/hr	0.45	hr/event	3.88	hr/event	17.57	hr	9.677
Indeno(1,2,3-cd)pyrene	0.6	1.0E+00	cm/hr	0.45	hr/event	3.78	hr/event	16.83	hr	6.654
Naphthalene	1	4.7E-02	cm/hr	0.45	hr/event	0.56	hr/event	1.34	hr	0.203
Total PCB Aroclors (as Aroclor 1254)	0.5	7.6E-01	cm/hr	0.45	hr/event	7.18	hr/event	31.57	hr	5.244
alpha-BHC	0.9	1.2E-02	cm/hr	0.45	hr/event	4.57	hr/event	10.97	hr	0.080
gamma-Chlordane	0.7	3.8E-02	cm/hr	0.45	hr/event	21.21	hr/event	50.91	hr	0.294
4,4'-DDD	0.8	1.8E-01	cm/hr	0.45	hr/event	6.65	hr/event	25.99	hr	1.234
4,4'-DDE	0.8	1.6E-01	cm/hr	0.45	hr/event	6.48	hr/event	25.08	hr	1.067
4,4'-DDT	0.7	2.7E-01	cm/hr	0.45	hr/event	10.45	hr/event	42.51	hr	1.948
Heptachlor	0.8	8.6E-03	cm/hr	0.45	hr/event	13.27	hr/event	31.85	hr	0.064
2,3,7,8-TCDD Toxic Equivalence	0.5	8.1E-01	cm/hr	0.45	hr/event	6.82	hr/event	30.09	hr	5.573
Aluminum	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Arsenic	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Barium	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Cadmium	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Chromium	1	2.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Cobalt	1	4.0E-04	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Iron	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Manganese	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--
Vanadium	1	1.0E-03	cm/hr	0.45	hr/event	--	hr/event	--	hr	--

Notes

FA = Fraction Absorbed Water; default value = 1 (USEPA, 2004)

Kp = Dermal Permeability Coefficient of chemical in water (USEPA, 1996b and USDOE, 2011)

T(event) = Event Duration

Tau = Lag Time

T* = Time to Reach Steady-State

B = Dimensionless Ratio of the Permeability Coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis

RAGS Part D IEUBK Model Worksheet

APPENDIX E
RAGS D IEUBK LEAD WORKSHEET

Site Name: CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE, OPERABLE UNIT 3
Receptor: Child Resident (Age 0 to 84 Months)

1. Lead Screening Questions

Medium	Lead Concentration Used in Model Run		Basis for Lead Concentration Used For Model Run	Lead Screening Concentration		Basis for Lead Screening Level
	Value	Units		Value	Units	
Ground-water	2.6	µg/L	Arithmetic average for the entire aquifer, including 1/2 reporting limits for non-detected values.	15	µg/L	USEPA Regional Screening Level for tapwater use is the drinking water action level of 15 µg/L.

2. Lead Model Questions

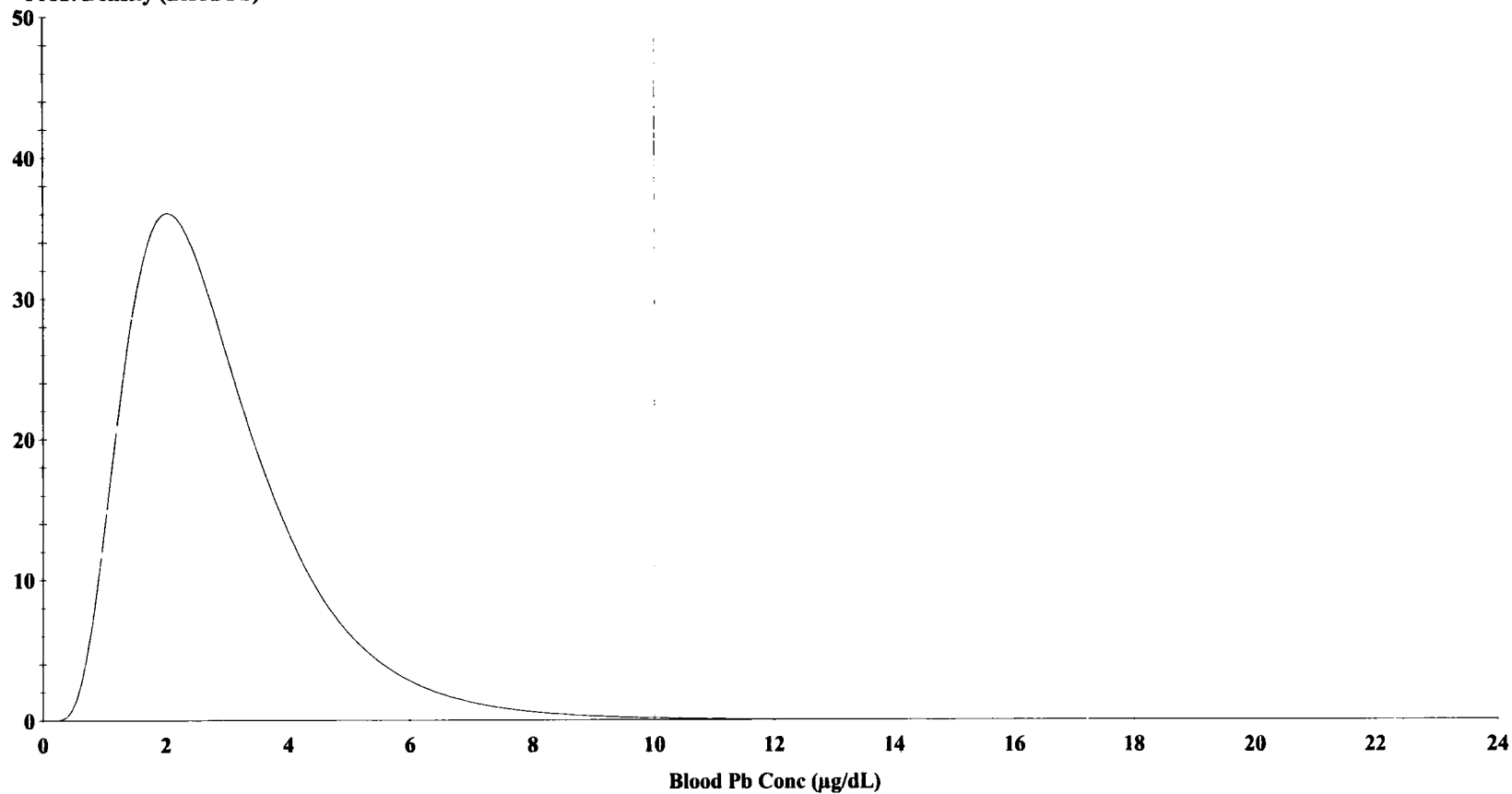
Question	Response for Residential Lead Model
What lead model (version and date) was used?	USEPA IEUBK Model Win32, Version 1.1
Where are the input values located in the risk assessment report?	RAGS Part D Table 3.1 (Appendix A) and this worksheet.
What range of media concentrations were used for the model?	Other than arithmetic average concentration in groundwater listed above, default media concentrations were used (i.e., 200 µg/g in soil, 0.1 mg/m ³ in outdoor air, indoor air 30% outdoor air, multiple source analysis for indoor dust).
What statistics were used to represent the exposure concentration terms and where are the data on concentrations in the risk assessment that support use of these statistics?	Arithmetic average concentration in groundwater, as shown in RAGS Part D Table 3.1.RME . Groundwater data for the entire aquifer are summarized in RAGS Part D Table 2.1 .
Was soil sample taken from top 2 cm? If not, why?	Not applicable
Was soil sample sieved? What size screen was used? If not sieved, provide rationale.	Not applicable
What was the point of exposure/location?	Tap water use by a child resident outside the boundaries of the Former CDE Facility.
Where are the output values located in the risk assessment report?	The IEUBK output files are attached in Appendix E .
Was the model run using default values only?	Yes, with the exception of the groundwater concentration noted above.

Was the default soil bioavailability used?	Yes. Default media absorption fractions of 30% for soil and dust and 50% for water and diet were used. A default lung absorption of 32% was used for all age groups.
Was the default soil ingestion rate used?	Yes. Default total dust and soil intake values, in g/day, for the seven age groups are: 0.085, 0.135, 0.135, 0.135, 0.1, 0.09, and 0.085. Default ventilation rates, in m ³ /day, for the seven age groups are: 2, 3, 5, 5, 5, 7, and 7. Default dietary intake values, in µg/day, for the seven age groups are: 2.26, 1.96, 2.13, 2.04, 1.95, 2.05, and 2.22. Default water consumption values, in L/day, for the seven age groups are: 0.2, 0.5, 0.52, 0.53, 0.55, 0.58, 0.59.
If non-default values were used, where is the rationale for the values located in the risk assessment report?	Not applicable.

3. Final Result

Medium	Result	Comment/PRG ¹
Groundwater	Arithmetic average concentration of lead in groundwater of 2.6 µg/L results in an estimated geometric mean PbB of 2.6 µg/dL and a 0.22% probability that the target PbB of 10 µg/dL is exceeded.	Not applicable.

Prob. Density (Blood Pb)



Cutoff = 10.000 µg/dl
Geo Mean = 2.623
GSD = 1.600
% Above = 0.220
% Below = 99.780

Age Range = 0 to 84 months

Run Mode = Research

APPENDIX F

Alternate Human Health Evaluation, Excluding Groundwater Data from MW-06, MW-11, MW-12, and MW-14S

Appendix F, Table F-1
Evaluation of Detected COPC Concentrations in Entire Aquifer Data Set
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Chemical of Potential Concern (COPC)	Detected Concentrations in Groundwater																
	Shallow Bedrock Wells									Multi-Port Well Sampler Port							
	MW-06 (29-44 feet bgs)		MW-11 (34-59 feet bgs)			MW-12 (35-60 feet bgs)			MW-14S-01 (30-35 feet bgs)		MW-14S-02 (41-46 feet bgs)		MW-14S-03 (55-60 feet bgs)		MW-14S-04 (65-70 feet bgs)		
	Oct 2009	Mar/Apr 2010	Oct 2009	Mar/Apr 2010	July 2010	Oct 2009	Mar/Apr 2010	July 2010	Oct 2009	Mar/Apr 2010	Oct 2009	Mar/Apr 2010	Oct 2009	Mar/Apr 2010	Oct 2009	Mar/Apr 2010	July 2010
cis-1,2-Dichloroethene	8,800	1,000	390,000	53,000	NS	12,000	4,800	NS	130,000	46,000	94,000	43,000	58,000	32,000	15,000	15,000	NS
Tetrachloroethene	1,600	110	< 500	50	NS	< 250	11	NS	< 500	0.76	< 100	24	< 500	0.69	< 50	11	NS
1,2,4-Trichlorobenzene	< 40	24	320	360	NS	< 250	1,600	NS	< 500	8.5	< 100	140	< 500	3	340	320	NS
Trichloroethene	9,600	1,400	170,000	23,000	NS	16,000	8,800	NS	72,000	17,000	64,000	19,000	30,000	11,000	9,900	1,700	NS
Vinyl chloride	78	57	710	860	NS	< 250	43	NS	560	21	370	530	< 500	14	< 50	150	NS
Dibenzo(a,h)anthracene	< 0.1	5.5	< 0.1	< 0.1	NS	< 0.1	0.16	NS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.11	< 0.19	< 0.1	NS
Total PCB Aroclors	< 0.09	9.6	27	190	NS	3.5	16	NS	81	38	5.2	101	42	9.8	12,900	65	NS
gamma-Chlordane	< 0.052	0.29	< 0.054	21	NS	< 0.051	1.4	NS	< 0.053	0.67	< 0.052	6.2	< 0.056	0.13	< 26	370	NS
4,4'-DDD	< 0.1	R	0.63	R	NS	0.33	R	NS	2.2	R	0.99	R	1.2	R	1,800	R	NS
4,4'-DDE	< 0.1	0.2	0.69	9.8	NS	1.1	R	NS	1.6	R	0.72	4.6	1	0.095	1,600	260	NS
4,4'-DDT	< 0.1	R	1.4	36	NS	0.75	R	NS	4.5	R	2.2	12	2.2	< 0.1	4,000	840	NS
Heptachlor	< 0.052	< 0.05	0.51	4.5	NS	1.4	5.1	NS	< 0.053	0.37	< 0.052	2.6	< 0.056	< 0.05	300	120	NS
2,3,7,8-TCDD Toxic Equivalence	NS	NS	NS	R	8.4E-04	NS	5.0E-04	1.0E-04	NS	NS	NS	NS	NS	NS	NS	2.1E-01	2.2E-01
Arsenic	1.8	1.7	1.4	2.2	NS	1.2	1.6	NS	43.3	9.1	52.8	5.5	45	7	72.3	7.7	NS

Notes
Concentrations shaded grey were not included in the BHHRA because they are indicative of non-aqueous phase liquid.
Concentration units are µg/L.
bgs - below ground surface
NS - not sampled
R - indicates sample result was rejected

Appendix F, Table F-2
Revised EPCs for Alternate Evaluation of Entire Aquifer Data
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Chemical of Potential Concern (COPC)	Exposure Point Concentration (EPC)	
	Baseline Risk Assessment (µg/L)	Alternate Evaluation (µg/L)
cis-1,2-Dichloroethene	14,139	918
Tetrachloroethene	36	3.4
1,2,4-Trichlorobenzene	58	8.5
Trichloroethene	7,041	1,207
Vinyl chloride	53	12
Dibenzo(a,h)anthracene	0.17	0.12
Total PCB Aroclors	4.4	0.60
gamma-Chlordane	11	0.21
4,4'-DDD	160	0.14
4,4'-DDE	48	0.16
4,4'-DDT	120	0.44
Heptachlor	9.7	0.17
2,3,7,8-TCDD Toxic Equivalence	2.6E-05	Not applicable
Arsenic	76	79

Appendix F, Table F-3
Comparison of Cancer Risks and Noncancer Hazards
Baseline Human Health Risk Assessment
Cornell Dubiller Electronics Inc. Superfund Site OU3

Human Receptor Population		Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices				COPCs with Cancer Risks > 1E-04 or Noncancer Hazards > 1E+00
		Exposure Routes			Receptor Total	Exposure Routes			Receptor Total	
		Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation		
Commercial/Industrial Worker	Baseline HHRA	N/A	5E-03	3E-03	8E-03	N/A	1E+02	2E+01	1E+02	cis-1,2-DCE; PCE; 1,2,4-TCB; TCE; DBA; Total PCB Aroclors; 4,4'-DDT and derivatives; Heptachlor; 2,3,7,8-TCDD TEQ
	Alternate Evaluation	N/A	6E-04	5E-04	1E-03	N/A	2E+01	3E+00	2E+01	1,2,4-TCB; TCE; DBA; Total PCB Aroclors; 2,3,7,8-TCDD TEQ
Resident Adult	Baseline HHRA	6E-03	1E-02	1E-03	2E-02	2E+02	1E+02	4E+00	4E+02	cis-1,2-DCE; PCE; 1,2,4-TCB; TCE; VC; DBA; Total PCB Aroclors; gamma-Chlordane; 4,4'-DDT and derivatives; Heptachlor; 2,3,7,8-TCDD TEQ; As
	Alternate Evaluation	2E-03	1E-03	2E-04	4E-03	2E+01	2E+01	7E-01	4E+01	cis-1,2-DCE; TCE; VC; DBA; Total PCB Aroclors; 2,3,7,8-TCDD TEQ; As
Resident Child	Baseline HHRA	2E-03	4E-03	5E-04	7E-03	5E+02	3E+02	1E+01	8E+02	cis-1,2-DCE; PCE; 1,2,4-TCB; TCE; VC; DBA; Total PCB Aroclors; gamma-Chlordane; 4,4'-DDT and derivatives; Heptachlor; 2,3,7,8-TCDD TEQ; As
	Alternate Evaluation	9E-04	6E-04	9E-05	2E-03	5E+01	5E+01	2E+00	1E+02	cis-1,2-DCE; 1,2,4-TCB; TCE; VC; DBA; Total PCB Aroclors; 2,3,7,8-TCDD TEQ; As

Notes

N/A - exposure route not applicable

APPENDIX G

Evaluation of ERT-5, ERT-6, and MW-18 Groundwater Data Only

Appendix Table G-1
Summary of Groundwater Data from ERT-5, ERT-6, and MW-18
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics, Inc. Superfund Site OU3

COPLs for Aquifer or Shallow Offsite SBB Groundwater Data Sets, also Detected in ERT-5, ERT-6, and MW-18	10/13/2009 24-34 ERT-5-01	10/13/2009 37-47 ERT-5-02	10/13/2009 50-60 ERT-5-03	10/13/2009 77-87 ERT-5-04	10/13/2009 93-98 ERT-5-05	10/13/2009 120-130 ERT-5-06	10/20/2009 26-36 ERT-6-01	10/20/2009 75-85 ERT-6-02	10/20/2009 93-103 ERT-6-03	10/20/2009 107-117 ERT-6-04	10/20/2009 128-138 ERT-6-05	10/13/2009 160-170 MW-18-01	10/13/2009 210-220 MW-18-02	3/24/2010 24-34 ft ERT-5-01	3/24/2010 37-47 ft ERT-5-02	3/24/2010 50-60 ft ERT-5-03
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.78	0.5 U	0.5 U	0.48	0.58	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.36	2	0.83	0.27	0.5 U	3.6	4.2	2.1	2.2	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.51	0.5 U	0.5 U	0.5 U	0.34	0.5 U	0.5 U	0.5 U	0.54	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	1.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.54	0.5 U	0.5 U
Methylene chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.48	0.95	2.4	28	0.5 U	0.55	0.8	6.5	45	52	52	0.5 U	0.5 U	0.5 U
bis(2-EHP)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.2	5 U	5 U
Dibenzo[a,h]anthracene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 U	0.1 U	0.1 U
Indeno[1,2,3-cd]pyrene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.11	0.12	0.1 U
Naphthalene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Aroclor-1254	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.24	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.05 U	0.073	0.071
2,3,7,8-TCDD TEQ																
gamma-Chlordane	0.054 U	0.052 U	0.05 U	0.052 U	0.051 U	0.053 U	0.051 U	0.056 U	0.053 U	0.051 U	0.05 U	0.052 U	0.051 U	0.05 U	0.08	0.05 U
Aluminum	100	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Arsenic	2.2	1.3	1.9	1.9	2.3	2.4	5.3	3.8	1.6	2.4	2.7	24.8	54.7	0.85	1.1	1.5
Barium	182	197	129	107	107	77.8	790.5	294	219	187	91.3	47.7	49.3	158	192	121
Cadmium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.04	1 U	1 U	1 U	1 U	1 U
Chromium	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Iron	180	100 U	100 U	100 U	100 U	100 U	1290	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Lead	1 U	1 U	3.4	1.5	3.2	1	1 U	1.5	1.8	1.4	2.4	2.3	1.7	0.52	0.71	0.94
Manganese	179	0.86	0.18	0.85	0.87	0.34	62.3	3.1	1 U	1 U	1 U	3	5	34.9	0.29	1 U
Vanadium	5 U	5 U	6.5	6.5	7.8	8.7	5 U	5.3	5.1	5.8	8.8	10.8	12.4	3.2	4.5	6.4

Appendix Table G-1
Summary of Groundwater Data from ERT-5, ERT-6, and MW-18
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics, Inc. Superfund Site OU3

COPCs for Aquifer or Shallow Offsite SBB Groundwater Data Sets, also Detected in ERT-5, ERT-6, and MW-18	3/24/2010 77-87 ft ERT-5-04	3/24/2010 93-98 ft ERT-5-05	3/24/2010 120-130 ft ERT-5-06	3/26/2010 26-36 ft ERT-6-01	3/26/2010 75-85 ft ERT-6-02	3/26/2010 93-103 ft ERT-6-03	3/26/2010 107-117 ft ERT-6-04	3/26/2010 128-138 ft ERT-6-05	3/24/2010 160-170 ft MW-18-01	3/24/2010 210-220 ft MW-18-02	Frequency of Detection	Range of Detected Concentrations	Exposure Point Concentration	Rationale
												(µg/L)	(µg/L)	
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3 / 26	0.48 - 0.78	0.52	95% UCL concentration
cis-1,2-Dichloroethene	0.5 U	0.5 U	1.2	0.36	0.5 U	0.5 U	1.5	2.5	1.6	1.9	14 / 26	0.27 - 4.2	1.479	95% UCL concentration
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3 / 26	0.34 - 0.54	0.375	95% UCL concentration
Methyl tert-butyl ether	0.23	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3 / 26	0.23 - 1.2	0.359	95% UCL concentration
Methylene chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 / 26	1.4	1.4	Single detected concentration
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.12	1 / 26	0.12	0.12	Single detected concentration
Trichloroethene	0.47	0.58	18	0.5 U	0.5 U	0.87	5.6	35	20	57	18 / 26	0.47 - 57	18.79	95% UCL concentration
bas(2-EHP)	5 U	3.5	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	2 / 26	1.2 - 3.5	3.5	Dataset consists of two detected observations
Dibenzo(a,h)anthracene	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.36	0.1 U	1 / 26	0.36	0.36	Single detected concentration
Indeno(1,2,3-cd)pyrene	0.1	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.58	0.1 U	4 / 26	0.1 - 0.58	0.155	95% UCL concentration
Naphthalene	0.1 U	0.1 U	0.1 U	0.084	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 / 26	0.084	0.084	Single detected concentration
Aroclor-1254	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.11	0.05 U	4 / 26	0.071 - 0.24	0.0919	95% UCL concentration
2,3,7,8-TCDD TEQ											1 / 2	1.1E-08	1.1E-08	Dataset consists of two detected observations
gamma-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 / 26	0.08	0.08	Single detected concentration
Aluminum	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	1 / 26	100	100	Single detected concentration
Arsenic	1.7	1.9	2.3	6.9	2.7	1.7	2.5	2.6	90.4	9.2	26 / 26	0.85 - 90.4	26	95% UCL concentration
Barium	97.8	101	81.1	885	308	236	189	76.7	55.6	47.4	26 / 26	47.4 - 885	256.6	95% UCL concentration
Cadmium	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 / 26	0.04	0.04	Single detected concentration
Chromium	2 U	0.47	0.68	0.57	0.63	0.45	2 U	0.43	2 U	2 U	6 / 26	0.43 - 0.68	0.611	95% UCL concentration
Iron	100 U	100 U	100 U	1870	100 U	100 U	100 U	100 U	100 U	100 U	3 / 26	180 - 1870	444.3	95% UCL concentration
Lead	0.41	0.7	0.75	0.61	2.4	1.9	0.84	0.87	1	0.58	23 / 26	0.41 - 3.4	1.619	95% UCL concentration
Manganese	1 U	1 U	1 U	484	2.1	1 U	1.1	1.1	209	6.1	18 / 26	0.18 - 484	245.6	95% UCL concentration
Vanadium	6.7	7.1	8.3	3.4	5.7	5.5	6.3	8.7	5.5	9.6	23 / 26	3.2 - 12.4	7.324	95% UCL concentration

Appendix G, Table G-2
Cancer Risks and Noncancer Hazards Estimated Using Data from ERT-5, ERT-6, and MW-18 Only
Baseline Human Health Risk Assessment
Cornell Dubilier Electronics Inc. Superfund Site OU3

Human Receptor Population	Incremental Lifetime Cancer Risks				Non-Cancer Hazard Indices				COPCs with Cancer Risks > 1E-04 or Noncancer Hazards > 1E+00
	Exposure Routes			Receptor Total	Exposure Routes			Receptor Total	
	Ingestion	Dermal Contact	Inhalation		Ingestion	Dermal Contact	Inhalation		
Commercial/Industrial Worker	N/A	4E-04	1E-05	5E-04	N/A	1E+00	2E-02	1E+00	DBA; Total PCB Aroclors
Resident Adult	6E-04	7E-04	5E-06	1E-03	3E+00	2E+00	9E-04	5E+00	DBA; Total PCB Aroclors; As
Resident Child	3E-04	8E-04	2E-06	1E-03	7E+00	4E+00	3E-03	1E+01	DBA; Total PCB Aroclors; As

Notes

N/A - exposure route not applicable